

**US Army Corps
of Engineers**
Louisville District

Design/Build Request For Proposal For

Whole Neighborhood Renewal Fort Knox, Kentucky Volume 3 of 3 Amendment #4

**10 December 2003
RFP DACA27-03-R-0020**

REQUEST FOR PROPOSAL

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SECTION 03150A

EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS
05/98

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SECTION 03300

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11/01

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SECTION 04200

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08/02

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01/02

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SECTION 06100A

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02/02

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SECTION 06200A

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11/01

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SECTION 06650

SOLID POLYMER (SOLID SURFACING) FABRICATIONS
10/00

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02/03

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08/99

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*** SAFETY PAYS ***

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SECTION 07840

FIRESTOPPING
04/03

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SECTION 07900A

JOINT SEALING
06/97

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 - 2.1.2 PVC
 - 2.1.3 Synthetic Rubber
 - 2.1.4 Neoprene
- 2.2 BOND-BREAKER
- 2.3 PRIMER
- 2.4 CAULKING
- 2.5 SEALANT
 - 2.5.1 LATEX
 - 2.5.2 ELASTOMERIC
 - 2.5.3 ACOUSTICAL
 - 2.5.4 BUTYL
 - 2.5.5 PREFORMED
 - 2.5.5.1 Tape
 - 2.5.5.2 Bead
 - 2.5.5.3 Foam Strip

2.6 SOLVENTS AND CLEANING AGENTS

PART 3 EXECUTION

3.1 GENERAL

3.1.1 Surface Preparation

3.1.2 Concrete and Masonry Surfaces

3.1.3 Steel Surfaces

3.1.4 Aluminum Surfaces

3.1.5 Wood Surfaces

3.2 APPLICATION

3.2.1 Masking Tape

3.2.2 Backing

3.2.3 Bond-Breaker

3.2.4 Primer

3.2.5 Sealant

3.3 CLEANING

-- End of Section --

SECTION 08110
STEEL DOORS AND FRAMES

05/01

PART 1 GENERAL

1.1 REFERENCES

1.2 SUBMITTALS

1.3 DELIVERY, STORAGE, AND HANDLING

PART 2 PRODUCTS

2.1 STANDARD STEEL AND VINYL CLAD DOORS

2.1.1 Classification - Level, Performance, Model

2.1.1.1 Standard Duty Doors

2.2 INSULATED STEEL DOOR SYSTEMS

2.3 VINYL CLAD DOOR SYSTEMS

2.3.1 French Patio Door

Text

2.4 ACCESSORIES

2.4.1 Louvers

2.4.1.1 Interior Louvers

2.4.1.2 Exterior Louvers

2.5 INSULATION CORES

2.6 FIRE DOORS AND FRAMES

2.6.1 Labels

2.7 WEATHERSTRIPPING

2.7.1 Integral Gasket

2.8 HARDWARE PREPARATION

2.9 FINISHES

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2.9.1 Factory-Primed Finish

2.9.2 Factory-Applied Enamel Finish

2.10 FABRICATION AND WORKMANSHIP

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Doors

3.1.2 Fire Doors and Frames

3.2 PROTECTION

3.3 CLEANING

3.4 SCHEDULE

-- End of Section --

SECTION 08210

WOOD DOORS
09/99

PART 1 GENERAL

1.1 REFERENCES

1.2 SUBMITTALS

1.3 DELIVERY, STORAGE, AND HANDLING

1.4 WARRANTY

PART 2 PRODUCTS

2.1 DOORS

2.1.1 Stile and Rail Doors

2.1.2 Flush Doors

2.1.2.1 Interior Flush Doors

2.1.3 Prehung Doors

2.2 ACCESSORIES

2.3 FABRICATION

2.3.1 Quality and Construction

2.3.2 Preservative Treatment

2.3.3 Adhesives and Bonds

2.3.4 Prefitting

2.3.5 Finishes

2.3.5.1 Field Painting

2.3.5.2 Factory Finish

2.3.5.3 Plastic Laminate Finish

2.3.5.4 Color

2.3.6 Water-Resistant Sealer

2.4 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Prehung Doors

3.2 SCHEDULE

-- End of Section --

SECTION 08361

SECTIONAL OVERHEAD DOORS
08/01

PART 1 GENERAL

1.1 REFERENCES

1.2 SUBMITTALS

1.3 DELIVERY, STORAGE, AND HANDLING

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Hard-Drawn Springwire

2.1.2 Oil-Tempered Springwire

2.1.3 Steel Sheet

2.1.4 Steel Shapes

2.1.5 Glass

2.2 DOORS

2.3 DESIGN REQUIREMENTS

2.4 FABRICATION

2.4.1 Steel Overhead Doors

2.4.1.1 Insulated Sections

2.4.2 Tracks

2.4.3 Hardware

2.4.4 Counterbalancing

2.5 MANUAL OPERATORS

2.5.1 Pushup Operators

2.6 WEATHER SEALS AND SAFETY DEVICE

2.7 FINISHES

2.7.1 Galvanized and Shop Primed

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PART 3 EXECUTION

3.1 INSTALLATION

3.2 TESTING

-- End of Section --

SECTION 08560

PLASTIC WINDOWS
08/01

PART 1 GENERAL

1.1 REFERENCES

1.2 SUBMITTALS

1.3 QUALITY ASSURANCE

1.3.1 Labels

1.3.2 Certification

1.4 DELIVERY, STORAGE, AND HANDLING

1.5 PROTECTION

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS FOR WINDOWS

2.2 MATERIALS

2.2.1 Windows

2.2.2 Glass and Glazing

2.2.3 Calking and Sealing

2.2.4 Insect Screening

2.2.5 Accessories

2.3 WINDOW TYPES

2.3.1 Casement Windows

2.3.2 Double Hung Windows

2.3.3 Dual Action (Tilt/Turn) Windows

2.3.3.1 Construction

2.3.3.2 Hardware

2.3.3.3 Performance Requirements

2.4 FABRICATION

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2.4.1 Subframes, Mullions and Transom Bars

2.4.2 Combination Windows

2.4.3 Frames and Sash

2.4.3.1 Corners and Reinforcement

2.4.3.2 Adjustability

2.4.3.3 Drips and Weep Holes

2.4.3.4 Provisions for Glazing

2.4.4 Hardware

2.4.5 Weatherstripping

2.4.6 Screens

2.4.7 Color

2.4.8 Fasteners

2.4.9 Accessories

2.4.9.1 Anchors

2.4.9.2 Window-Cleaner Anchors

2.4.9.3 Grills

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Anchors and Fastenings

3.2 ADJUSTING

3.3 CLEANING

3.4 PROTECTION

-- End of Section --

SECTION 08710

DOOR HARDWARE
02/02

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 HARDWARE SCHEDULE
- 1.4 KEY BITTING CHART REQUIREMENTS
- 1.5 QUALITY ASSURANCE
 - 1.5.1 Hardware Manufacturers and Modifications
- 1.6 DELIVERY, STORAGE, AND HANDLING

PART 2 PRODUCTS

- 2.1 TEMPLATE HARDWARE
- 2.2 HARDWARE FOR FIRE DOORS
- 2.3 HARDWARE ITEMS
 - 2.3.1 Hinges
 - 2.3.2 Spring Hinges
 - 2.3.3 Locks and Latches
 - 2.3.3.1 Residential Bored Locks and Latches
 - 2.3.4 Cylinders and Cores
 - 2.3.5 Keying System
 - 2.3.6 Lock Trim
 - 2.3.6.1 Knobs and Roses
 - 2.3.6.2 Lever Handles
 - 2.3.6.3 Texture
 - 2.3.7 Keys
 - 2.3.8 Door Stops and Viewers

2.3.9 Thresholds

2.3.10 Weather Stripping Gasketing

2.3.10.1 Interlocking Type

2.3.11 Lightproofing and Soundproofing Gasketing

2.4 FASTENERS

2.5 FINISHES

2.6 KEY CABINET AND CONTROL SYSTEM

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Weather Stripping Installation

3.1.2 Threshold Installation

3.2 FIRE DOORS

3.3 HARDWARE LOCATIONS

3.4 KEY CABINET AND CONTROL SYSTEM

3.5 FIELD QUALITY CONTROL

3.6 HARDWARE SETS

-- End of Section --

SECTION 08810A
GLASS AND GLAZING
05/97

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 SYSTEM DESCRIPTION
- 1.4 DELIVERY, STORAGE AND HANDLING
- 1.5 PROJECT/SITE CONDITIONS
- 1.6 WARRANTY
 - 1.6.1 Insulating Glass

PART 2 PRODUCTS

- 2.1 INSULATING GLASS
 - 2.1.1 Low-E Insulating Glass
- 2.2 REFLECTIVE GLASS
 - 2.2.1 Low-Emissivity (Low-E) Glass
- 2.3 HEAT-TREATED GLASS
 - 2.3.1 Tempered Glass
- 2.4 GLAZING ACCESSORIES
 - 2.4.1 Preformed Tape
 - 2.4.2 Sealant
 - 2.4.3 Glazing Gaskets
 - 2.4.3.1 Fixed Glazing Gaskets
 - 2.4.3.2 Wedge Glazing Gaskets
 - 2.4.3.3 Aluminum Framing Glazing Gaskets
 - 2.4.4 Putty and Glazing Compound

2.4.5 Setting and Edge Blocking

PART 3 EXECUTION

3.1 PREPARATION

3.2 INSTALLATION

3.3 CLEANING

3.4 PROTECTION

-- End of Section --

SECTION 09250

GYPSUM BOARD
11/01

PART 1 GENERAL

1.1 REFERENCES

1.2 SUBMITTALS

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery

1.3.2 Storage

1.3.3 Handling

1.4 ENVIRONMENTAL CONDITIONS

1.4.1 Temperature

1.4.2 Exposure to Weather

1.5 QUALIFICATIONS

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Gypsum Board

2.1.1.1 Regular

2.1.1.2 Type X (Special Fire-Resistant)

2.1.2 Gypsum Backing Board

2.1.2.1 Regular

2.1.2.2 Type X (Special Fire-Resistant)

2.1.3 Regular Water-Resistant Gypsum Backing Board

2.1.3.1 Regular

2.1.3.2 Type X (Special Fire-Resistant)

2.1.4 Cementitious Backer Units

2.1.5 Joint Treatment Materials

- 2.1.5.1 Embedding Compound
- 2.1.5.2 Finishing or Topping Compound
- 2.1.5.3 All-Purpose Compound
- 2.1.5.4 Setting or Hardening Type Compound
- 2.1.5.5 Joint Tape
- 2.1.6 Fasteners
 - 2.1.6.1 Screws
- 2.1.7 Adhesives
 - 2.1.7.1 Adhesive for Fastening Gypsum Board to Wood Framing
- 2.1.8 Gypsum Studs
- 2.1.9 Accessories
- 2.1.10 Asphalt Impregnated Building Felt
- 2.1.11 Water
- PART 3 EXECUTION
 - 3.1 EXAMINATION
 - 3.1.1 Framing and Furring
 - 3.1.2 Gypsum Board and Framing
 - 3.2 APPLICATION OF GYPSUM BOARD
 - 3.2.1 Application of Single-Ply Gypsum Board to Wood Framing
 - 3.2.2 Application of Two-Ply Gypsum Board to Wood Framing
 - 3.2.3 Adhesive Nail-On Application to Wood Framing
 - 3.2.4 Gypsum Board for Wall Tile or Tile Base Applied with Adhesive
 - 3.3 APPLICATION OF CEMENTITIOUS BACKER UNITS
 - 3.3.1 Application
 - 3.3.2 Joint Treatment
 - 3.4 FINISHING OF GYPSUM BOARD
 - 3.4.1 Uniform Surface

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3.5 SEALING

3.6 FIRE-RESISTANT ASSEMBLIES

3.7 PATCHING

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SECTION 09310

CERAMIC TILE, QUARRY TILE, AND PAVER TILE
8/02

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY AND STORAGE
- 1.4 ENVIRONMENTAL REQUIREMENTS
- 1.5 WARRANTY
- 1.6 EXTRA STOCK

PART 2 PRODUCTS

- 2.1 TILE
 - 2.1.1 PAVER TILE
 - 2.1.2 Glazed Wall Tile
 - 2.1.3 Accessories
- 2.2 SETTING-BED
 - 2.2.1 Aggregate for Concrete Fill
 - 2.2.2 Portland Cement
 - 2.2.3 Sand
 - 2.2.4 Hydrated Lime
 - 2.2.5 Metal Lath
 - 2.2.6 Reinforcing Wire Fabric
- 2.3 WATER
- 2.4 MORTAR, GROUT, AND ADHESIVE
 - 2.4.1 Dry-Set Portland Cement Mortar
 - 2.4.2 Conductive Dry-Set Mortar
 - 2.4.3 Latex-Portland Cement Mortar

2.4.4 Ceramic Tile Grout

2.4.5 Organic Adhesive

2.4.6 Epoxy Resin Grout

2.4.7 Furan Resin Grout

2.4.8 Cementitious Backer Board

2.4.9 Glass Mat Gypsum Backer Panel

2.5 MARBLE THRESHOLDS

PART 3 EXECUTION

3.1 PREPARATORY WORK AND WORKMANSHIP

3.2 GENERAL INSTALLATION REQUIREMENTS

3.3 INSTALLATION OF WALL TILE

3.3.1 Workable or Cured Mortar Bed

3.3.2 Dry-Set Mortar and Latex-Portland Cement Mortar

3.3.3 Organic Adhesive

3.3.4 Furan Mortar and Grout

3.4 INSTALLATION OF FLOOR TILE

3.4.1 Workable or Cured Mortar Bed

3.4.2 Dry-Set and Latex-Portland Cement

3.4.3 Ceramic Tile Grout

3.4.4 Waterproofing

3.4.5 Concrete Fill

3.5 INSTALLATION OF MARBLE THRESHOLDS

3.6 EXPANSION JOINTS

3.6.1 Walls

3.6.2 Floors

3.7 CLEANING AND PROTECTING

-- End of Section --

*** SAFETY PAYS ***

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SECTION 09645

WOOD FLOORING
07/02

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY AND STORAGE
- 1.4 ENVIRONMENTAL CONDITIONS
- 1.5 SCHEDULING
- 1.6 WARRANTY

PART 2 PRODUCTS

- 2.1 FLOORING MATERIALS
 - 2.1.1 Solid Flooring
 - 2.1.1.1 Grading
 - 2.1.1.2 Construction
 - 2.1.1.3 Dimensions
 - 2.1.1.4 Moisture Content
 - 2.1.1.5 Finish
 - 2.1.2 Accessories and Supporting Materials
 - 2.1.2.1 Adhesive
 - 2.1.2.2 PRIMER
 - 2.1.2.3 Shoe Molds
 - 2.2 FLOORING SYSTEMS
 - 2.2.1 Flooring on Concrete Slabs
 - 2.2.2 Flooring on Subflooring and Underlayment
- PART 3 EXECUTION
- 3.1 PREPARATION OF SURFACES

3.1.1 Concrete Slabs

3.1.2 Underlayment and Subflooring

3.1.3 Adhesive-Applied Wood Flooring on Concrete Slab

3.1.4 Nailed Wood Flooring on Subflooring and Underlayment

3.2 INSTALLATION

3.2.1 Flooring on Concrete Slabs

3.2.2 Flooring on Subflooring and Underlayment

3.2.3 Expansion Spaces

3.2.4 Shoe Molds

3.3 SANDING AND FINISHING SOLID FLOORING

3.3.1 Sanding

3.3.2 Finishing

3.4 PROTECTION

-- End of Section --

SECTION 09650

RESILIENT FLOORING
08/02

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY AND STORAGE
- 1.4 ENVIRONMENTAL REQUIREMENTS
- 1.5 SCHEDULING
- 1.6 WARRANTY
- 1.7 EXTRA MATERIALS

PART 2 PRODUCTS

- 2.1 UNDERLAYMENT
- 2.2 TILE FLOORING
 - 2.2.1 Vinyl-Composition Style
 - 2.2.2 Lining Felt
 - 2.2.3 Adhesive for Vinyl Composition Tile
- 2.3 STRIPS
 - 2.3.1 Edge
 - 2.3.2 Feature
 - 2.3.3 Transition
- 2.4 POLISH/FINISH
- 2.5 CAULKING AND SEALANTS
- 2.6 MANUFACTURER'S COLOR AND TEXTURE

PART 3 EXECUTION

- 3.1 EXAMINATION/VERIFICATION OF CONDITIONS
 - 3.1.1 Subfloor Requirements

3.1.2 Surface Examination

3.2 SURFACE PREPARATION

3.2.1 Concrete Floor

3.2.2 Plywood Underlayment

3.2.3 Final Cleaning of Substrate

3.3 MOISTURE TEST

3.4 GENERAL APPLICATION REQUIREMENTS

3.5 INSTALLATION OF VINYL-COMPOSITION TILE

3.6 INSTALLATION OF FEATURE STRIPS

3.7 CLEANING

3.8 PROTECTION

-- End of Section --

SECTION 09900

PAINTS AND COATINGS
02/02

PART 1 GENERAL

1.1 REFERENCES

1.2 SUBMITTALS

1.3 APPLICATOR'S QUALIFICATIONS

1.3.1 Contractor Qualification

1.4 QUALITY ASSURANCE

1.4.1 Field Samples and Tests

1.4.1.1 Sampling Procedure

1.4.1.2 Testing Procedure

1.4.2 Textured Wall Coating System

1.4.3 Sample Textured Wall Coating System Mock-Up

1.5 REGULATORY REQUIREMENTS

1.5.1 Environmental Protection

1.5.2 Lead Content

1.5.3 Chromate Content

1.5.4 Asbestos Content

1.5.5 Mercury Content

1.5.6 Silica

1.5.7 Human Carcinogens

1.6 PACKAGING, LABELING, AND STORAGE

1.7 SAFETY AND HEALTH

1.7.1 Safety Methods Used During Coating Application

1.7.2 Toxic Materials

1.8 ENVIRONMENTAL CONDITIONS

1.8.1 Coatings

1.9 COLOR SELECTION

1.10 LOCATION AND SURFACE TYPE TO BE PAINTED

1.10.1 Painting Included

1.10.1.1 Exterior Painting

1.10.1.2 Interior Painting

1.10.2 Painting Excluded

1.10.3 Mechanical and Electrical Painting

1.10.4 Exterior Painting of Site Work Items

1.10.5 MISCELLANEOUS PAINTING

1.10.6 Definitions and Abbreviations

1.10.6.1 Qualification Testing

1.10.6.2 Batch Quality Conformance Testing

1.10.6.3 Coating

1.10.6.4 DFT or dft

1.10.6.5 DSD

1.10.6.6 EPP

1.10.6.7 EXT

1.10.6.8 INT

1.10.6.9 micron / microns

1.10.6.10 mil / mils

1.10.6.11 mm

1.10.6.12 MPI Gloss Levels

1.10.6.13 MPI System Number

1.10.6.14 Paint

1.10.6.15 REX

1.10.6.16 RIN

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PART 2 PRODUCTS

2.1 MATERIALS

PART 3 EXECUTION

3.1 PROTECTION OF AREAS AND SPACES NOT TO BE PAINTED

3.2 SURFACE PREPARATION

3.3 PREPARATION OF METAL SURFACES

3.3.1 New Ferrous Surfaces

3.3.2 Final Ferrous Surface Condition:

3.3.3 Galvanized Surfaces

3.3.4 Non-Ferrous Metallic Surfaces

3.3.5 Terne-Coated Metal Surfaces

3.4 PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

3.4.1 Gypsum Board

3.5 PREPARATION OF WOOD AND PLYWOOD SURFACES

3.5.1 New Plywood and Wood Surfaces, Except Floors:

3.5.2 Wood Floor Surfaces, Natural Finish

3.5.3 Interior Wood Surfaces, Stain Finish

3.6 APPLICATION

3.6.1 Coating Application

3.6.2 Mixing and Thinning of Paints

3.6.3 Two-Component Systems

3.6.4 Coating Systems

3.7 COATING SYSTEMS FOR METAL

3.8 COATING SYSTEMS FOR WOOD AND PLYWOOD

3.9 PIPING IDENTIFICATION

3.10 INSPECTION AND ACCEPTANCE

3.11 PAINT TABLES

3.11.1 EXTERIOR PAINT TABLES

DIVISION 5: EXTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

EXTERIOR GALVANIZED SURFACES

EXTERIOR SURFACES, OTHER METALS (NON-FERROUS)

DIVISION 6: EXTERIOR WOOD; DRESSED LUMBER, PANELING, DECKING, SHINGLES PAINT TABLE

3.11.2 INTERIOR PAINT TABLES

DIVISION 5: INTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

INTERIOR STEEL / FERROUS SURFACES

DIVISION 9: GYPSUM BOARD PAINT TABLE

-- End of Section --

SECTION 09915

COLOR SCHEDULE
08/02

PART 1 GENERAL

1.1 GENERAL

1.2 SUBMITTALS

PART 2 PRODUCTS

2.1 REFERENCE TO MANUFACTURER'S COLOR

2.2 COLOR SCHEDULE

2.2.1 Exterior Walls

2.2.1.1 Brick

2.2.1.2 Mortar

2.2.1.3 Paint

2.2.1.4 Glass and Glazing

2.2.1.5 Cultured Stone

2.2.2 Exterior Trim

2.2.2.1 Steel Doors and Door Frames

2.2.2.2 Fascia

2.2.2.3 Soffits and Ceilings

2.2.2.4 Overhangs

2.2.2.5 Downspouts, Gutters, Louvers, and Flashings

2.2.2.6 Caulking and Sealants

2.2.2.7 Stringers and Stair Framing

2.2.2.8 Control Joints

2.2.2.9 Expansion Joint and/or Covers

2.2.2.10 Signage

2.2.3 Exterior Roof

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- 2.2.3.1 Shingles
- 2.2.3.2 Penetrations:
- 2.2.4 Interior Floor Finishes
 - 2.2.4.1 Vinyl Composition Tile
 - 2.2.4.2 Ceramic Tile
 - 2.2.4.3 Porcelain Tile
 - 2.2.4.4 Grout
 - 2.2.4.5 Wood
- 2.2.5 Interior Base Finishes
 - 2.2.5.1 Ceramic Tile
 - 2.2.5.2 Porcelain Tile
 - 2.2.5.3 Grout
 - 2.2.5.4 Paint
 - 2.2.5.5 Wood
- 2.2.6 Interior Wall Finishes
 - 2.2.6.1 Paint
 - 2.2.6.2 Ceramic Tile
 - 2.2.6.3 Ceramic Tile Grout
- 2.2.7 Interior Ceiling Finishes
 - 2.2.7.1 Paint
- 2.2.8 Interior Trim
 - 2.2.8.1 Wood Doors
 - 2.2.8.2 Wood Stain
 - 2.2.8.3 Window Sills
 - 2.2.8.4 Handrails
- 2.2.9 Interior Window Treatment
 - 2.2.9.1 Horizontal Blinds

2.2.10 Interior Miscellaneous

2.2.10.1 Solid Surfacing Material

2.2.10.2 Casework

2.2.10.3 Wall Switch Handles and Standard Receptacle Bodies

2.2.10.4 Electrical Device Cover Plates

2.2.10.5 Electrical Panels

2.2.10.6 Shower Curtain

2.3 PLACEMENT SCHEDULE

PART 3 EXECUTION (Not Applicable)

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SECTION 10800

TOILET ACCESSORIES
07/02

PART 1 GENERAL

1.1 REFERENCES

1.2 SUBMITTALS

1.3 DELIVERY, STORAGE, AND HANDLING

1.4 WARRANTY

PART 2 PRODUCTS

2.1 ACCESSORY ITEMS

2.1.1 Grab Bar (GB)

2.1.2 Medicine Cabinet (MC)

2.1.2.1 Swinging Door Cabinet, Class 2

2.1.3 Mirrors, Glass (MG)

2.1.4 Mirror, Tilt (MT)

2.1.5 Shower Curtain Rods (SCR)

2.1.6 Soap Holder (SH)

2.1.7 Towel Bar (TB)

2.1.8 Toilet Paper Holder

2.1.9 Toothbrush and Tumbler Holder (TTH)

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Recessed Accessories

3.1.2 Surface Mounted Accessories

3.2 CLEANING

3.3 SCHEDULE

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SECTION 12490A

WINDOW TREATMENT
01/98

PART 1 WORK DESCRIPTION

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 GENERAL
- 1.4 DELIVERY, STORAGE, AND HANDLING
- 1.5 FIELD MEASUREMENTS
- 1.6 WARRANTY

PART 2 PRODUCTS

- 2.1 WINDOW BLINDS
 - 2.1.1 Horizontal Blinds
 - 2.1.1.1 Head Channel and Slats
 - 2.1.1.2 Controls
 - 2.1.1.3 Intermediate Brackets
 - 2.1.1.4 Hold-Down Brackets
 - 2.1.2 Vertical Blinds
 - 2.1.2.1 Louvers
 - 2.1.2.2 Carriers
 - 2.1.2.3 Headrail System
 - 2.1.2.4 Cornice, Fascia, or Valance
 - 2.1.2.5 Controls
 - 2.1.2.6 Connectors and Spacers
 - 2.1.2.7 Intermediate Brackets
- 2.2 COLOR

PART 3 EXECUTION

3.1 INSTALLATION

-- End of Section --

SECTION 15050N

BASIC MECHANICAL MATERIALS AND METHODS
09/01

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 RELATED REQUIREMENTS
- 1.3 QUALITY ASSURANCE
 - 1.3.1 Material and Equipment Qualifications
 - 1.3.2 Alternative Qualifications
 - 1.3.3 Service Support
 - 1.3.4 Manufacturer's Nameplate
 - 1.3.5 Modification of References
 - 1.3.5.1 Definitions
 - 1.3.5.2 Administrative Interpretations
- 1.4 DELIVERY, STORAGE, AND HANDLING
- 1.5 ELECTRICAL REQUIREMENTS
- 1.6 ELECTRICAL INSTALLATION REQUIREMENTS
 - 1.6.1 New Work
 - 1.6.2 Modifications to Existing Systems
 - 1.6.3 High Efficiency Motors
 - 1.6.3.1 High Efficiency Single-Phase Motors
 - 1.6.3.2 High Efficiency Polyphase Motors
 - 1.6.4 Three-Phase Motor Protection
- 1.7 INSTRUCTION TO GOVERNMENT PERSONNEL
- 1.8 ACCESSIBILITY

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PAINTING OF NEW EQUIPMENT

3.1.1 Factory Painting Systems

3.1.2 Shop Painting Systems for Metal Surfaces

-- End of Section --

SECTION 15080A

THERMAL INSULATION FOR MECHANICAL SYSTEMS
07/02

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SYSTEM DESCRIPTION
- 1.3 GENERAL QUALITY CONTROL
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 - 1.3.2 Installer's Qualifications
 - 1.3.3 Surface Burning Characteristics
 - 1.3.4 Identification of Materials
- 1.4 SUBMITTALS
- 1.5 STORAGE

PART 2 PRODUCTS

- 2.1 GENERAL MATERIALS
 - 2.1.1 Adhesives
 - 2.1.1.1 Acoustical Lining Insulation Adhesive
 - 2.1.1.2 Mineral Fiber Insulation Cement
 - 2.1.1.3 Lagging Adhesive
 - 2.1.2 Contact Adhesive
 - 2.1.3 Caulking
 - 2.1.4 Corner Angles
 - 2.1.5 Finishing Cement
 - 2.1.6 Fibrous Glass Cloth and Glass Tape
 - 2.1.7 Staples
 - 2.1.8 Jackets
 - 2.1.8.1 White Vapor Retarder All Service Jacket (ASJ)

2.1.8.2 Aluminum Jackets

2.1.8.3 Polyvinyl Chloride (PVC) Jackets

2.1.9 Vapor Retarder Required

2.1.9.1 Vapor Retarder Mastic Coatings

2.1.9.2 Laminated Film Vapor Retarder

2.1.10 Vapor Retarder Not Required

2.1.11 Wire

2.1.12 Sealants

2.2 PIPE INSULATION MATERIALS

2.2.1 Aboveground Cold Pipeline

2.2.1.2 Mineral Fiber Insulation

Mineral fiber insulation is prohibited for aboveground cold pipeline.

2.2.2 Aboveground Hot Pipeline

2.2.3 Above Ground Dual Temperature Pipeline - Outdoors, Indoor - Exposed
or Concealed

2.2.4 Below-ground Pipeline Insulation

2.2.4.1 Cellular Glass

2.3 DUCT INSULATION MATERIALS

2.3.1 Rigid Mineral Fiber

2.3.2 Flexible Mineral Fiber

2.3.3 Cellular Glass

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2.3.5 Flexible Elastomeric Cellular

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3.2.2.1 Insulation Thickness

3.2.2.2 Jacket for Mineral Fiber, Cellular Glass, and Phenolic Foam
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3.2.2.3 Insulation for Straight Runs (Mineral Fiber, Cellular Glass, and
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3.2.2.4 Insulation for Fittings and Accessories

3.2.2.5 Optional PVC Fitting Covers

3.2.3 Aboveground Hot Pipelines

3.2.3.1 Insulation Thickness

3.2.3.2 Jacket for Insulated Hot Pipe, Except Pipe Insulated with
Flexible Elastomeric Cellular

3.2.3.3 Insulation for Straight Runs

3.2.3.4 Insulation for Fittings and Accessories

3.2.4 Below ground Pipe Insulation

3.2.4.1 Type of Insulation

3.2.4.2 Installation of Below ground Pipe Insulation

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3.3.2 Insulation and Vapor Retarder for Cold Air Duct

3.3.2.1 Installation on Exposed Duct Work

3.3.3 Ducts Handling Air for Dual Purpose

3.3.4 Insulation for Evaporative Cooling Duct

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-- End of Section --

SECTION 15182A
REFRIGERANT PIPING
02/03

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- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 QUALIFICATIONS
- 1.4 SAFETY REQUIREMENTS
- 1.5 DELIVERY, STORAGE, AND HANDLING
- 1.6 PROJECT/SITE CONDITIONS
 - 1.6.1 Verification of Dimensions
 - 1.6.2 Drawings
 - 1.6.3 Spare Parts

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- 2.1 STANDARD COMMERCIAL PRODUCTS
- 2.2 ELECTRICAL WORK
- 2.3 REFRIGERANT PIPING SYSTEM
- 2.4 PIPE, FITTINGS AND END CONNECTIONS (JOINTS)
 - 2.4.1 Copper Tubing
 - 2.4.2 Solder
 - 2.4.3 Brazing Filler Metal
- 2.5 VALVES
 - 2.5.1 Refrigerant Stop Valves
 - 2.5.2 Check Valves
 - 2.5.3 Liquid Solenoid Valves
 - 2.5.4 Expansion Valves

- 2.5.5 Safety Relief Valves
- 2.5.6 Evaporator Pressure Regulators, Direct-Acting
- 2.5.7 Refrigerant Access Valves
- 2.6 PIPING ACCESSORIES
 - 2.6.1 Filter Driers
 - 2.6.2 Sight Glass and Liquid Level Indicator
 - 2.6.2.1 Assembly and Components
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 - 2.6.2.3 Bull's-Eye and Inline Sight Glass Reflex Lens
 - 2.6.2.4 Moisture Indicator
 - 2.6.3 Vibration Dampeners
 - 2.6.4 Flexible Pipe Connectors
 - 2.6.5 Strainers
 - 2.6.6 Pressure and Vacuum Gauges
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 - 2.6.7.2 Bimetallic Dial
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3.1.2 Functional Requirements

3.1.3 Fittings and End Connections

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3.1.3.2 Brazed Connections

3.1.3.3 Flared Connections

3.1.3.4 Flanged Connections

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3.1.4.2 Expansion Valves

3.1.4.3 Valve Identification

3.1.5 Vibration Dampers

3.1.6 Strainers

3.1.7 Filter Dryer

3.1.8 Sight Glass

3.1.9 Discharge Line Oil Separator

3.1.10 Accumulator

3.1.11 Flexible Pipe Connectors

3.1.12 Temperature Gauges

3.1.13 Pipe Hangers, Inserts, and Supports

3.1.13.1 Hangers

- 3.1.13.2 Inserts
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- 3.2 CLEANING AND ADJUSTING
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 - 3.3.2 Pneumatic Test
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-- End of Section --

SECTION 15400A

PLUMBING, GENERAL PURPOSE
04/03

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- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 STANDARD PRODUCTS
- 1.4 ELECTRICAL WORK
- 1.5 PERFORMANCE REQUIREMENTS
- 1.6 REGULATORY REQUIREMENTS
- 1.7 PROJECT/SITE CONDITIONS

PART 2 PRODUCTS

- 2.1 MATERIALS
- 2.2 VALVES
 - 2.2.1 Wall Hydrants
 - 2.2.2 Relief Valves
- 2.3 FIXTURES
 - 2.3.1 Upgraded Plumbing Fixtures

All plumbing fixtures shall be manufacturer's designer line and be approved by Contracting Officer.

2.3.1.1 Water Closets

Water closets shall be low flow type.
0.211 liter (0.8 gallon) per flush water closets shall be prohibited.

2.3.1.2 Lavatories

Lavatories shall be one piece polymer solid surface with integral bowl and counter.

2.3.1.3 Bathtub

Bathtubs shall be porcelain enamel formed steel.
Tub surrounds shall be polymer solid surface and full height.

2.3.1.4 Faucets and Drains

1. Shower Heads

Shower heads shall be low flow type.

2.3.2 Handicap Fixtures

2.4 DRAINS

2.4.1 Bathtub Drains

2.5 TRAPS

2.6 WATER HEATERS

2.6.1 Automatic Storage Type

2.6.1.1 Electric Type

2.7 PUMPS

2.7.1 Circulating Pumps

2.7.2 Flexible Connectors

2.8 DOMESTIC WATER SERVICE METER

2.9 RANGE HOODS

Range hoods shall be stainless steel with length equal to range. The hood shall be equipped with NFPA approved wet chemical fire suppression system. The hood shall have separately switched light and exhaust fan and washable filter. Sound level shall not exceed 6 sones. Duct exhaust to outside and provide backdraft protection

2.10 APPLIANCES

2.10.1 Range and Refrigerator Shall be Government Furnished

2.10.2 Dishwasher

2.10.3 Garbage Disposal

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

*** SAFETY PAYS ***

Amendment 4

Whole Neighborhood Renewal - Fort Knox, KY

DACA27-03-R-0020

3.1.1 Water Pipe, Fittings, and Connections

- 3.1.1.1 Utilities
- 3.1.1.2 Cutting and Repairing
- 3.1.1.3 Protection of Fixtures, Materials, and Equipment
- 3.1.1.4 Mains, Branches, and Runouts
- 3.1.1.5 Pipe Drains
- 3.1.1.6 Expansion and Contraction of Piping
- 3.1.1.7 Water Hammer Arresters
- 3.1.2 Joints
 - 3.1.2.1 Threaded
 - 3.1.2.2 Mechanical Couplings
 - 3.1.2.3 Unions and Flanges
 - 3.1.2.4 Copper Tube and Pipe
 - 3.1.2.5 Plastic Pipe
- 3.1.3 Pipe Sleeves and Flashing
 - 3.1.3.1 Flashing Requirements
 - 3.1.3.2 Waterproofing
 - 3.1.3.3 Optional Counterflashing
- 3.1.4 Fire Seal
- 3.1.5 Supports
 - 3.1.5.1 General
- 3.1.6 Pipe Cleanouts
- 3.2 WATER HEATERS AND HOT WATER STORAGE TANKS
 - 3.2.1 Relief Valves
 - 3.2.2 Heat Traps
 - 3.2.3 Connections to Water Heaters
- 3.3 FIXTURES AND FIXTURE TRIMMINGS
 - 3.3.1 Fixture Connections

*** SAFETY PAYS ***

Whole Neighborhood Renewal - Fort Knox, KY

Amendment 4
DACA27-03-R-0020

3.3.2 Height of Fixture Rims Above Floor

Whole Neighborhood Renewal - Fort Knox, KY

- 3.3.3 Shower Bath Outfits
- 3.3.4 Access Panels
- 3.3.5 Traps
- 3.4 WATER METER REMOTE READOUT REGISTER
- 3.5 ESCUTCHEONS
- 3.6 TESTS, FLUSHING AND DISINFECTION
 - 3.6.1 Plumbing System
 - 3.6.2 Defective Work
 - 3.6.3 System Flushing
 - 3.6.3.1 During Flushing
 - 3.6.3.2 After Flushing
 - 3.6.4 Operational Test
 - 3.6.5 Disinfection
- 3.7 PLUMBING FIXTURE SCHEDULE
- 3.8 POSTED INSTRUCTIONS
- 3.9 PERFORMANCE OF WATER HEATING EQUIPMENT
 - 3.9.1 Storage Water Heaters
 - 3.9.1.1 Electric
- 3.10 TABLES

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PIPE AND FITTING MATERIALS FOR
DRAINAGE, WASTE, AND VENT PIPING SYSTEMS

TABLE II
PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS

TABLE III
STANDARD RATING CONDITIONS AND MINIMUM PERFORMANCE RATINGS FOR WATER HEATING
EQUIPMENT

-- End of Section --

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SECTION 15810N

DUCTWORK AND DUCTWORK ACCESSORIES
09/99

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- 1.1 REFERENCES
- 1.2 RELATED REQUIREMENTS
- 1.3 PRESSURE CLASSIFICATION
- 1.4 Design Requirements
 - 1.4.1 Duct Span Versus Reinforcement Schedule
 - 1.4.2 Automatic Dampers
 - 1.4.3 Sound Pressure Level Rating
 - 1.4.4 Sound Attenuators and Attenuator Ducts Acoustical Tests
 - 1.4.5 Plenum or Casing Acoustical Tests
- 1.5 SUBMITTALS
- 1.6 QUALITY ASSURANCE
 - 1.6.1 Qualification of Installer for Fibrous Glass Ductwork
 - 1.6.2 Daily Report for Fibrous Glass Ductwork
 - 1.6.3 Modification of References
 - 1.6.4 Ductwork and Ductwork Accessories

PART 2 PRODUCTS

- 2.1 METAL DUCTS
 - 2.1.1 Steel Ducts
 - 2.1.2 Duct-Liner Adhesives
- 2.2 DUCTS OF PRESSURE CLASSES
 - 2.2.1 Construction
 - 2.2.2 Joints

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2.2.6.1 Net Noise Reduction Values

2.2.6.2 Factory-Fabricated Sound Attenuators (Traps)

2.2.7 Safety Relief Valve

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2.3.2 Laps

2.3.3 Fittings

2.3.4 Acoustical Attenuator Systems

2.3.4.1 Acoustical Duct Lining

2.3.4.2 Preformed Duct Liner

2.3.4.3 Sound Attenuators (Traps)

2.4 FLEXIBLE DUCTS AND CONNECTORS

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2.4.3 Joints

2.5 CASINGS AND PLENUMS

2.6 DIFFUSERS, REGISTERS, AND GRILLES

2.6.1 Material and Finishes

2.6.2 Sound Pressure Level

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2.6.5 Ceiling Diffusers

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2.10 DAMPERS AND LOUVERS

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3.1.1.1 Field Changes to Ductwork

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3.1.1.3 Deflectors

3.1.1.4 Access Doors

3.1.1.5 Duct Sleeves, Prepared Openings, and Closure Collars

3.1.1.6 Packing

3.1.2 Duct Hangers and Supports

3.1.2.1 Flexible Ducts

3.1.2.2 Flexible Connectors

3.1.3 Inspection Plates and Test Holes

3.1.4 Acoustical Duct Lining

3.1.5 Sound Attenuators

3.1.6 Flashing

3.1.7 Cleaning of Ducts

3.2 FIELD QUALITY CONTROL

3.2.1 Air Duct Leakage Tests

-- End of Section --

SECTION 15895

AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM
02/03

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 COORDINATION OF TRADES
- 1.3 DELIVERY AND STORAGE
- 1.4 FIELD MEASUREMENTS
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- 2.3 NAMEPLATES
- 2.4 EQUIPMENT GUARDS AND ACCESS
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 - 2.5.3.2 Globe Valves
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 - 2.5.3.4 Angle Valves
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 - 2.5.3.6 Butterfly Valves
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- 2.5.6 Backflow Preventers
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- 2.5.8 Pressure Gauges
- 2.5.9 Thermometers
- 2.5.10 Escutcheons
- 2.5.11 Pipe Hangers, Inserts, and Supports
- 2.5.12 Expansion Joints
 - 2.5.12.1 Slip Joints
 - 2.5.12.2 Flexible Ball Joints
 - 2.5.12.3 Bellows Type Joints
- 2.5.13 Insulation
- 2.5.14 Condensate Drain Lines
- 2.6 ELECTRICAL WORK
- 2.7 CONTROLS
- 2.8 DUCTWORK COMPONENTS
 - 2.8.1 Metal Ductwork
 - 2.8.1.1 Transitions
 - 2.8.1.2 Metallic Flexible Duct
 - 2.8.1.3 Insulated Nonmetallic Flexible Duct Runouts
 - 2.8.1.4 General Service Duct Connectors
 - 2.8.2 Ductwork Accessories
 - 2.8.2.1 Duct Access Doors
 - 2.8.2.2 Splitters and Manual Balancing Dampers
 - 2.8.2.3 Air Deflectors and Branch Connections
 - 2.8.3 Duct Sleeves, Framed Prepared Openings, Closure Collars

- 2.8.3.1 Duct Sleeves
- 2.8.3.2 Framed Prepared Openings
- 2.8.3.3 Closure Collars
- 2.8.4 Plenums and Casings for Field-Fabricated Units
 - 2.8.4.1 Plenum and Casings
 - 2.8.4.2 Casing
 - 2.8.4.3 Access Doors
 - 2.8.4.4 Duct Liner
- 2.8.5 Sound Attenuation Equipment
- 2.8.6 Diffusers, Registers, and Grilles
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 - 2.8.6.2 Registers and Grilles
- 2.8.7 Louvers
- 2.8.8 Bird Screens and Frames
- 2.9 AIR SYSTEMS EQUIPMENT
 - 2.9.1 Fans
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 - 2.9.1.2 In-Line Centrifugal Fans
 - 2.9.1.3 Axial Flow Fans
 - 2.9.1.4 Centrifugal Type Power Roof Ventilators
 - 2.9.1.5 Propeller Type Power Roof Ventilators
 - 2.9.2 Coils
 - 2.9.2.1 Direct-Expansion Coils
 - 2.9.3 Air Filters
 - 2.9.3.1 Extended Surface Pleated Panel Filters
 - 2.9.3.2 Cartridge Type Filters
 - 2.9.3.3 Sectional Cleanable Filters

2.9.3.4 High-Efficiency Particulate Air (HEPA) Filters

2.9.3.5 Range and Griddle Hood Service

2.9.3.6 Holding Frames

2.9.3.7 Filter Gauges

2.10 AIR HANDLING UNITS

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2.10.1.1 Casings

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2.10.1.3 Air Filters

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3.1.1 Supports

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3.1.1.2 Seismic Requirements (Pipe Supports and Structural Bracing)

3.1.1.3 Pipe Hangers, Inserts and Supports

3.1.2 Pipe Sleeves

3.1.2.1 Roof and Floor Sleeves

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3.1.5 Air Vents and Drains

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3.1.8 Access Panels

3.1.9 Flexible Connectors

3.1.10 Sleeved and Framed Openings

3.1.11 Metal Ductwork

3.1.12 Kitchen Exhaust Ductwork

3.1.12.1 Ducts Conveying Smoke and Grease Laden Vapors

3.1.13 Acoustical Duct Lining

3.1.14 Dust Control

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3.1.16 Duct Test Holes

3.2 FIELD PAINTING AND IDENTIFICATION SYSTEMS

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3.2.2 Finish Painting and Pipe Color Code Marking

3.2.3 Color Coding Scheme for Locating Hidden Utility Components

3.3 DUCTWORK LEAK TEST

3.4 DAMPER ACCEPTANCE TEST

3.5 TESTING, ADJUSTING, AND BALANCING

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3.7 CLEANING AND ADJUSTING

3.8 FIELD TRAINING

-- End of Section --

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SECTION 15950A

HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS
12/01

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 GENERAL REQUIREMENTS
 - 1.3.1 Verification of Dimensions
 - 1.3.2 Drawings
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 - 2.2.2 Standard Signals
 - 2.2.3 Ambient Temperature Limits
 - 2.2.4 Nameplates, Lens Caps, and Tag Nameplates
 - 2.2.5 Year 2000 Compliance
- 2.3 MATERIALS
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 - 2.3.1.1 Terminal Blocks
 - 2.3.1.2 Control Wiring for 24-Volt Circuits
 - 2.3.1.3 Analog Signal Wiring Circuits
 - 2.3.1.4 Instrumentation Cable

- 2.3.1.5 Nonconducting Wiring Duct
- 2.3.1.6 Transformers
- 2.4 ACTUATORS
- 2.5 DAMPERS
 - 2.5.1 Damper Assembly
 - 2.5.1.1 Operating Links
 - 2.5.1.2 Damper Types
 - 2.5.2 Outside-Air
 - 2.5.3 Damper End Switches
- 2.6 INSTRUMENTATION
 - 2.6.1 Measurements
 - 2.6.2 Temperature Instruments
 - 2.6.2.1 Resistance Temperature Detectors (RTD)
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 - 2.6.2.3 RTD Transmitter
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- 2.8 SINGLE-LOOP CONTROLLERS
 - 2.8.1 Controller Features
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- 2.8.4 Controller Accuracy
- 2.8.5 Self-Tuning
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- 2.9 CONTROL DEVICES AND ACCESSORIES
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 - 2.9.2 Relays
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 - 2.9.7 Thermostats (Programmable)
 - 2.9.8 Power Line Conditioner (PLC)
- 2.10 MANUAL SWITCHES
- 2.11 HVAC SYSTEM CONTROL PANELS
 - 2.11.1 Panel Assembly
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 - 2.11.3 Enclosure
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3.1.2 Wiring Criteria

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3.3.1.3 HVAC System Ground Source Distribution Pump Operation

3.3.1.4 HVAC System Ground Source Distribution Pump Not Operating

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3.3.2.3 Space Temperature Control

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3.4.1.9 Controller-Tuning Procedure

3.4.1.10 Controller Manual-Tuning Procedure

3.4.1.11 Setting the Controller

3.4.2 Central Plant, Ground Source Hydronic Loop

3.4.3 Heating and Ventilating

3.4.4 Single-Zone with Evaporator/Condenser Coil; No Return Fan

3.5 BALANCING, COMMISSIONING, AND TESTING

3.5.1 Coordination with HVAC System Balancing

3.5.2 Control System Calibration, Adjustments, and Commissioning

3.5.3 Performance Verification Test

3.5.4 Posted and Panel Instructions

3.6 TRAINING

3.6.1 Training-Course Requirements

3.6.2 Training-Course Content

-- End of Section --

SECTION 15990A

TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS
04/03

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 SIMILAR TERMS
- 1.4 TAB STANDARD
- 1.5 QUALIFICATIONS
 - 1.5.1 TAB Firm
 - 1.5.2 TAB Specialist
- 1.6 TAB SPECIALIST RESPONSIBILITIES

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

- 3.1 DESIGN REVIEW
- 3.2 TAB RELATED HVAC SUBMITTALS
- 3.3 TAB SCHEMATIC DRAWINGS AND REPORT FORMS
- 3.4 DUCTWORK LEAK TESTING
- 3.5 TESTING, ADJUSTING, AND BALANCING
 - 3.5.1 TAB Procedures
 - 3.5.2 Systems Readiness Check
 - 3.5.3 Preparation of TAB Report
 - 3.5.4 TAB Verification
 - 3.5.5 Marking of Setting
 - 3.5.6 Identification of Test Ports

*** SAFETY PAYS ***

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-- End of Section --

SECTION 15995A
COMMISSIONING OF HVAC SYSTEMS
12/01

PART 1 GENERAL

1.1 SUBMITTALS

Section added per John Allison, M-Ja-3.

1.2 SEQUENCING AND SCHEDULING

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 COMMISSIONING TEAM AND CHECKLISTS

3.2 TESTS

3.2.1 Pre-Commissioning Checks

3.2.2 Functional Performance Tests

-- End of Section --

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SECTION 16415A
ELECTRICAL WORK, INTERIOR
06/02

PART 1 GENERAL

Relevant Sections have been inserted into 16415A from 16402N. Sections 16050N and 16402N have been deleted per Don Boley.

1.1 REFERENCES

1.2 GENERAL

1.2.1 Rules

1.2.2 Coordination

1.2.3 Special Environments

1.2.3.1 Weatherproof Locations

1.2.4 Standard Products

1.2.5 Nameplates

1.2.5.1 Identification Nameplates

1.2.6 As-Built Drawings

1.3 SUBMITTALS

1.4 WORKMANSHIP

PART 2 PRODUCTS

2.1 CABLES AND WIRES

2.1.1 Insulation

2.1.2 Bonding Conductors

2.1.3 Service Entrance Cables

2.1.4 Non-Metallic Sheathed Cable

2.2 CONDUIT

2.2.1 Rigid Metallic Conduit

2.2.2 Rigid Nonmetallic Conduit

2.3 CONDUIT AND DEVICE BOXES AND FITTINGS

2.3.1 Boxes, Nonmetallic, Outlet and Flush-Device Boxes and Covers

2.3.2 Boxes, Switch (Enclosed), Surface-Mounted

2.3.3 Fittings for Conduit and Outlet Boxes

2.3.4 Fittings, PVC, for Use with Rigid PVC Conduit

2.4 CONNECTORS, WIRE PRESSURE

2.4.1 For Use With Copper Conductors

2.5 ELECTRICAL GROUNDING AND BONDING EQUIPMENT

2.5.1 Ground Rods

2.6 ENCLOSURES

2.6.1 Cabinets and Boxes

2.6.2 Circuit Breaker Enclosures

2.7 LOW-VOLTAGE FUSES AND FUSEHOLDERS

2.7.1 Fuses, Low Voltage Cartridge Type

2.7.2 Fuses, Class R

2.8 LOAD CENTERS FOR HOUSING UNITS

2.8.1 Load Center Buses

2.8.2 Circuit Breakers

2.8.2.1 Molded-Case Circuit Breakers

a. Construction

b. Ratings

c. Thermal-Magnetic Trip Elements

2.8.2.2 Multipole Breakers

2.8.2.3 Arc-Fault Circuit-Interrupters

2.8.2.4 Circuit Breakers with GFI

2.8.2.5 HACR Rated Breakers

2.9 SWITCHES

2.9.1 Toggle Switches

2.9.2 Disconnect Switches

2.10 RECEPTACLES

2.10.1 Switched Duplex Receptacles

2.10.2 Weatherproof Receptacles

2.10.3 Ground-Fault Circuit Interrupter Receptacles

2.10.4 Range Receptacles

2.10.5 Dryer Receptacles

2.11 DEVICE PLATES

2.12 AIR-VAPOR BARRIER BOXES

Provide air-vapor barrier box for all electrical boxes installed in exterior walls. The air-vapor barrier box shall be made of thicker polyethylene and rigid in construction. It shall resist cuts and tears during installation. The box shall have a hinged feature to facilitate in easy installation of any standard electrical box. The box shall be sturdy and reinforced, capable of withstanding the pressure needed to make a complete seal with the air vapor barrier material. The box shall not allow any contact between air-vapor barrier materials. Minimum dimensions of the box shall be 165mm x 191mm x 73mm (6-1/2x7-1/2-2-7/8).

2.13 DEVICE PLATES

2.14 SERVICE ENTRANCE EQUIPMENT

2.15 METER BASE

2.16 SPLICE, CONDUCTOR

2.17 SMOKE DETECTORS

Provide single station photoelectric smoke detector in each sleeping room, outside of each separate sleeping area in the immediate vicinity of the sleeping rooms and on each level of the housing unit. Each detector shall contain an alarm sounder capable of producing minimum 85 dBA at 3050mm (10 ft), test button and visible indicating lamp. Lamp shall indicate when the detector is in normal standby mode and provide a different indication when the detector is in alarm. The detector shall provide indication of any malfunction. All detectors within the housing unit shall be interconnected in multiple-station configuration so that when any detector is activated all alarm sounders shall operate. Detector shall operate at 120 VAC. Provide a separate circuit from the Housing unit's Load Center. Provide detectors with 9-volt alkaline standby battery. Locate and install detector in accordance with NFPA 72.

2.18 CARBON MONOXIDE DETECTOR

Provide single station carbon monoxide detectors centrally located outside of each separate sleeping area in the immediate vicinity of the sleeping rooms and on each level of the housing unit. Detector shall operate at 120 VAC. Provide a separate circuit from the Housing unit's Load Center. Provide detectors with 9-volt alkaline standby battery. Operating ambient temperature shall be 32 degrees to 120 degrees Fahrenheit. Detector shall contain an alarm sounder capable of producing minimum 85 dBA at 3050mm (10 ft) and Red LED for visual alarm. Detector shall be equipped with continuous digital display and peak level memory. Detector shall also contain yellow or amber LED for malfunction indication and white or green indicator light for Power on indication, while operating at 120V. Provide a manually operated alarm test and reset button. Pressing the button shall silence the alarm, and reset the detector. Alarm shall resound within 6 minutes of CO level remains at or above 70 ppm. Locate and install detector in accordance with NFPA 720.

2.19 TELEPHONE SYSTEM

2.19.1 Telephone Outlets

2.19.2 Cover Plates

2.19.3 Cables

2.19.4 Telephone Terminal Box

2.20 CABLE ACCESS TELEVISION (CATV) SYSTEM

2.20.1 CATV outlets

2.20.2 Cover Plates

2.20.3 Cables

2.20.4 CATV Terminal Box

2.21 FIRE STOPPING MATERIALS

PART 3 EXECUTION

3.1 GROUNDING

3.1.1 Ground Rods

3.1.2 Grounding Conductors

3.2 WIRING METHODS

3.2.1 Conduit and Tubing Systems

- 3.2.1.1 Pull Wires
- 3.2.1.2 Below Slab-on-Grade or in the Ground
- 3.2.1.3 Installing in Slabs Including Slabs on Grade
- 3.2.1.4 Changes in Direction of Runs
- 3.2.1.5 Supports
- 3.2.1.6 Exposed Raceways
- 3.2.2 Cables and Conductors
 - 3.2.2.1 Sizing
 - 3.2.2.2 Cable Systems
 - 3.2.2.3 Cable Splicing
 - 3.2.2.4 Conductor Identification and Tagging
- 3.3 BOXES AND SUPPORTS
 - 3.3.1 Box Applications
 - 3.3.2 Brackets and Fasteners
 - 3.3.3 Mounting in Walls, Ceilings, or Recessed Locations
- 3.4 DEVICE PLATES
- 3.5 PAINTING AND FINISHING
- 3.6 FIELD TESTING
 - 3.6.1 Safety
 - 3.6.2 Ground-Resistance Tests
 - 3.6.3 Cable Tests
 - 3.6.3.1 Low Voltage Cable Tests
 - 3.6.4 GFI Receptacle Test
 - 3.6.5 Circuit Breaker Tests
 - 3.6.5.1 Circuit Breakers, Low Voltage
 - 3.6.5.2 Circuit Breakers, Molded Case
 - 3.6.5.3 Arc-Fault Interrupter Test

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3.7 SMOKE DETECTOR TEST

3.8 CARBON MONOXIDE DETECTOR TEST

3.9 OPERATING TESTS

3.10 ACCEPTANCE

-- End of Section --

SECTION 16510N
INTERIOR LIGHTING
02/03

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 RELATED REQUIREMENTS
- 1.3 DEFINITIONS
 - 1.3.1 Average Life
 - 1.3.2 Total Harmonic Distortion (THD)
- 1.4 SUBMITTALS
- 1.5 QUALITY ASSURANCE
 - 1.5.1 Fluorescent Electronic Ballasts
 - 1.5.2 Lighting Fixtures, Complete With Lamps and Ballasts
 - 1.5.3 Information Card
- 1.6 ELECTRONIC BALLAST WARRANTY

PART 2 PRODUCTS

- 2.1 FLUORESCENT LIGHTING FIXTURES
 - 2.1.1 Fluorescent Lamp Electronic Ballasts
 - 2.1.1.1 T-8 Lamp Ballast
 - 2.1.1.2 F17T8 Lamp Ballast
 - 2.1.2 Fluorescent Lamps
 - 2.1.3 Compact Fluorescent Fixtures
 - 2.1.4 Open-Tube Fluorescent Fixtures
- 2.2 INCANDESCENT LIGHTING FIXTURES
 - 2.2.1 Incandescent Lamps
 - 2.2.2 Incandescent Dimmer Switch
- 2.3 RECESS- AND FLUSH-MOUNTED FIXTURES

2.4 SUSPENDED FIXTURES

2.5 SECURITY FLOOD LIGHT WITH MOTION DETECTOR AND PHOTOCCELL

The security flood light fixture and sensor head shall be constructed of non-metallic materials. The fixture shall be UL listed for outdoor installation. The sensor shall be capable of detecting motion at 100 degrees and up to 21.3 meters (70 feet). The time and sensitivity settings of the sensor shall be adjustable. The fixture shall contain two sockets and shall accommodate Par 38 incandescent lamps per socket. The maximum wattage of the lamps shall be 150 watts.

Paragraph 2.6 Time Switch was deleted per Don Boley.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Lamps

3.1.2 Lighting Fixtures

-- End of Section --

ATTACHMENT 3

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ATTACHMENT 4
PROPOSAL DATA SHEETS
(SEE SPECIFICATION SECTION 00115)

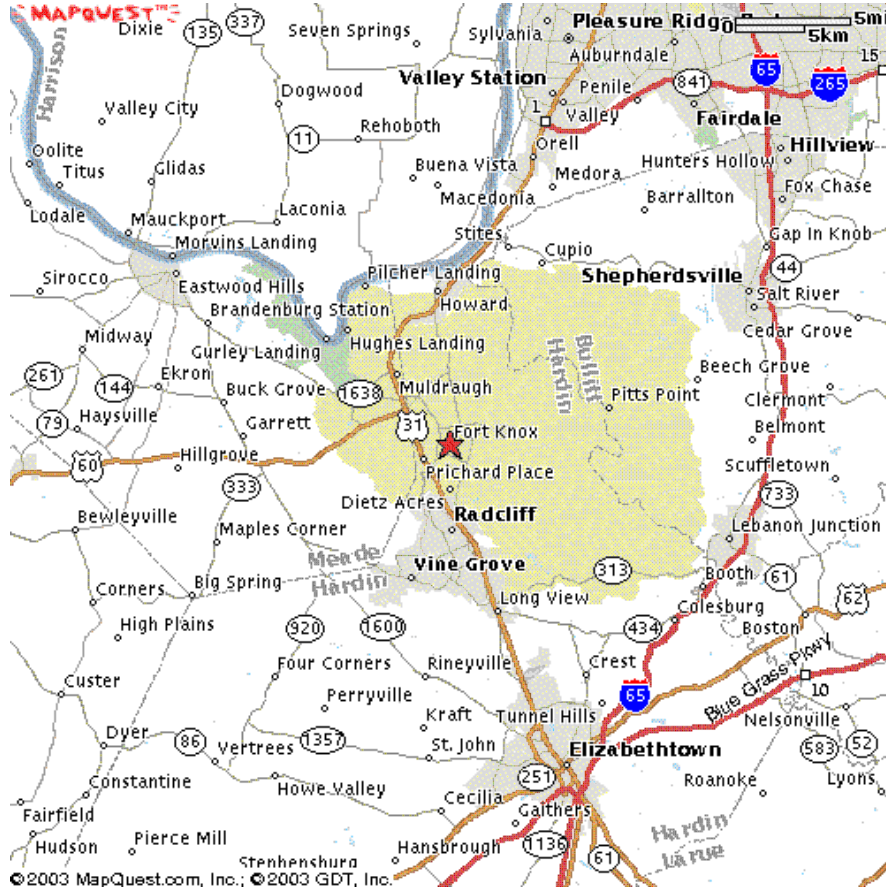
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ATTACHMENT 5
PROPOSAL DRAWING FORMAT
(SEE SPECIFICATION SECTION 00115)

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ATTACHMENT 6
SITE AND LOCALITY MAPS

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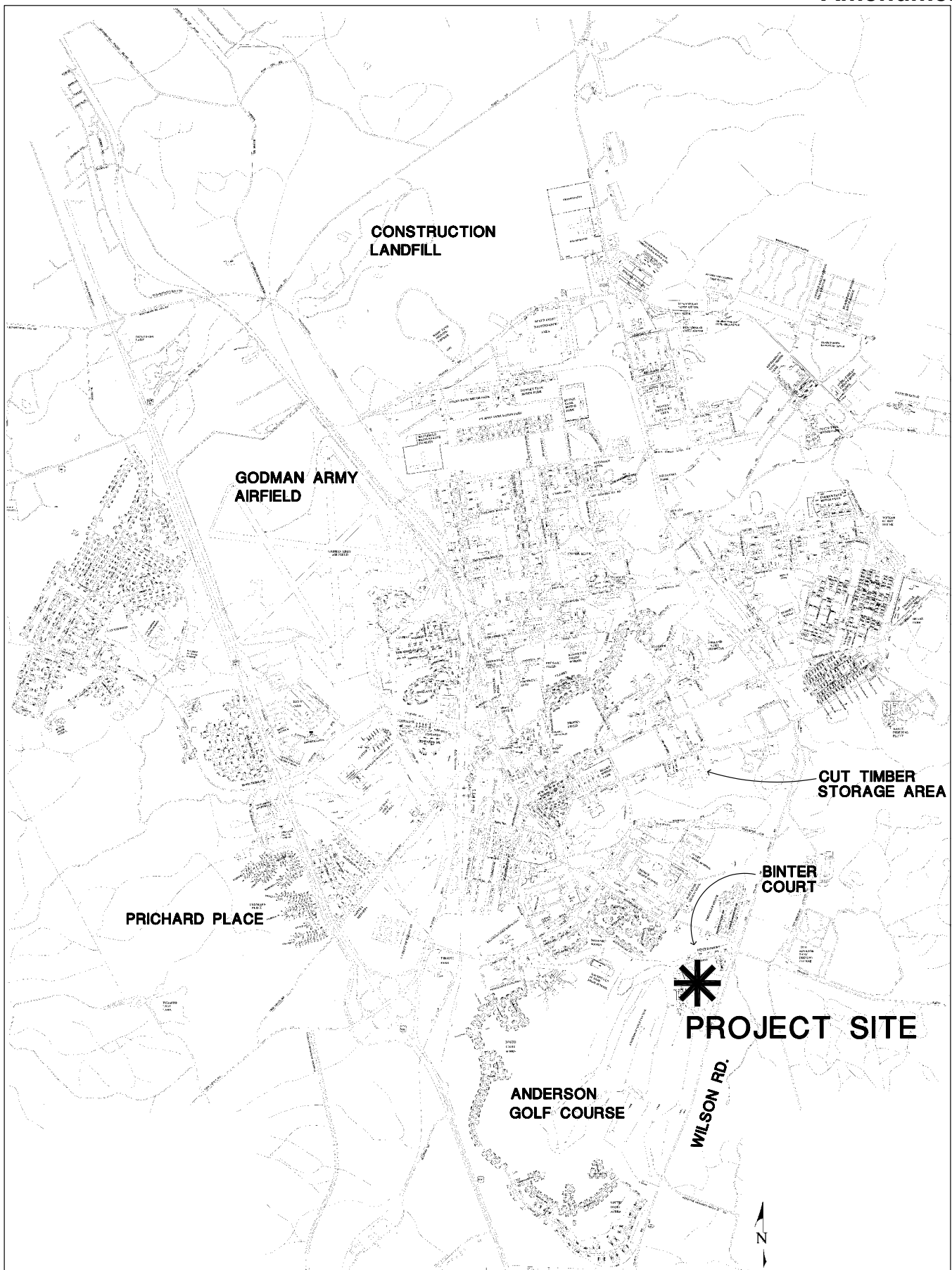


RSP Architects, Ltd.
1220 Marshall Street NE
Minneapolis, MN 55413
612-677-7100

FORT KNOX KENTUCKY AREA LOCATION MAP



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RSP Architects, Ltd.
 1220 Marshall Street NE
 Minneapolis, MN 55413
 612-677-7100

SITE LOCATION MAP- FT. KNOX



US ARMY CORPS
 OF ENGINEERS
 LOUISVILLE DISTRICT

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ATTACHMENT 7
PROJECT AND SAFETY SIGNS
(SEE SPECIFICATION SECTIONS 00800 AND 01525)

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ATTACHMENT 9

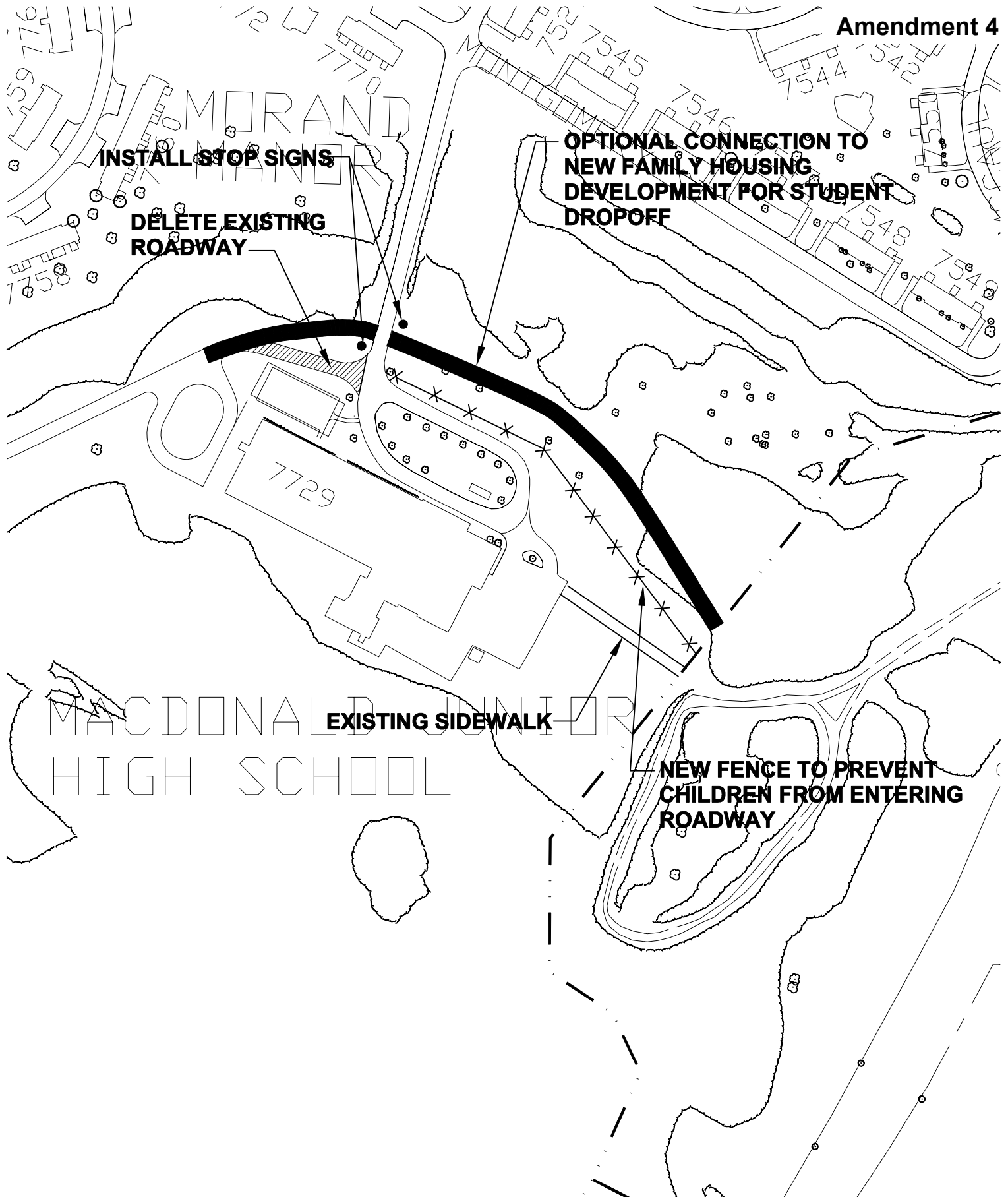
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ATTACHMENT 10

Option “O” – MacDonald School Connection Concept

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ATTACHMENT 10

OPTION "O"

McDONALD SCHOOL CONNECTION

SCALE: 1"=200'

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ATTACHMENT 11

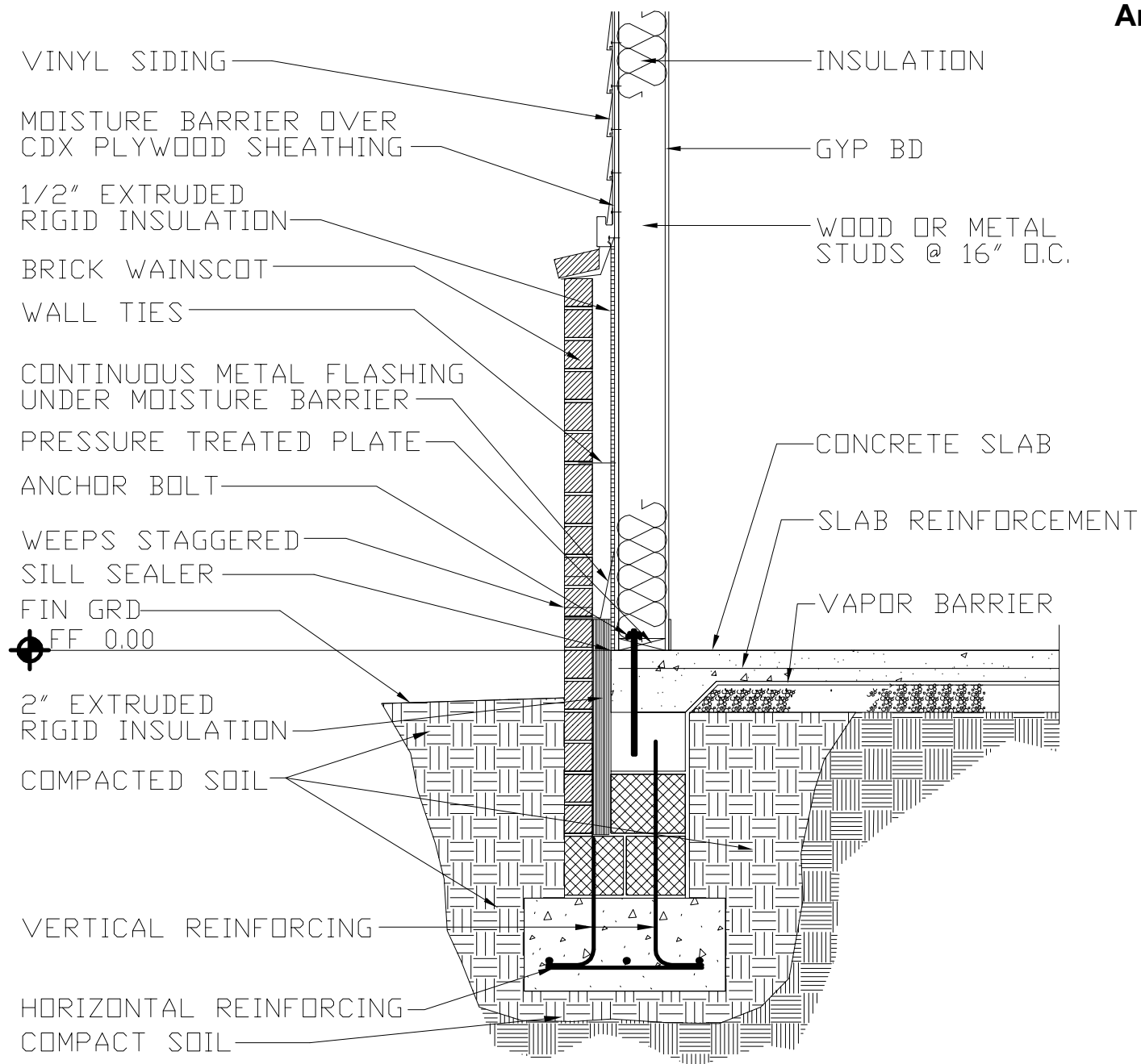
LIST OF DRAWINGS

(SEE SPECIFICATION SECTION 00800)

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ATTACHMENT 12
Exterior Wall Section

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WALL DETAIL - BRICK & SIDING

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ATTACHMENT 13
SAMPLE SUSTAINABILITY MATRIX

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SUSTAINABLE PROJECT RATING TOOL - FORT KNOX

26-Nov-2003

FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
1.0 Sustainable Sites (S)		20	12			0
1.R1 Erosion, Sedimentation and Water Quality Control		Req'd.	-			
Design a site sediment and erosion control plan and a pollution prevention plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-833-R-92-00(1), Chapter 3, OR local Erosion and Sedimentation Control standards and codes, whichever is more stringent. The plan shall meet the following objectives:				Required by SPiRiT rating. Consider using native grasses leading to retention areas, around sink holes, streams, and swales to filter out sediment and help prevent erosion.		
Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.				Required by SPiRiT rating.		
Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter				Required by SPiRiT rating.		
Prevent hazardous material discharge into storm water systems.				Required by SPiRiT rating. Use only natural ("green") fertilizers.		
Prevent petroleum oils and lubricants (POL) discharge into storm water systems.				Required by SPiRiT rating.		
1.C1 Site Selection		2	2			0
Do not develop buildings on portions of sites that meet any one of the following criteria: (1)			1	Building on sites with slopes 25% or greater is prohibited by the RFP. Consider avoiding slopes of 15% - 25% wherever possible. Consider utilizing existing vegetation to provide summer shade and to buffer from winter winds. Also consider reducing lawn mowing by promoting non-maintained, highly detailed turf areas.		
Prime training or maneuver land.				OK. Site has been determined not to be in training or maneuver land.		
Land whose elevation is lower than 5 ft. above the (1)00-year flood elevation as defined by FEMA.				OK. Site has been determined to be beyond 100-year base flood elevation as defined by FEMA.		
Land that provides habitat for any species on the Federal or State threatened or endangered list.				OK. Endangered species of tree bats are present on site - Indiana Bat and Grey Bat Habitat, but cutting of trees during the period of 4/1 to 10/31 is prohibited by the RFP. Consider preserving maximum amount of mature vegetation possible.		
Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233 and Part 22, OR as defined by local or state rule or law, whichever is more stringent.				OK. It has been determined that no wetlands are located within 100 feet of site.		

SUSTAINABLE PROJECT RATING TOOL - FORT KNOX

26-Nov-2003

FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Select site based on functional adjacencies/relationships and land use compatibility. (1)		1			
Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure.			OK. The site is close to Wilson Road and existing utilities located there.		
Select site in area of high density			OK. Site within Cantonment area.		
Site facilities based on the strength of their relationships to other facilities/land-uses to limit travel distances. The stronger the relationship/functional interaction, the closer the distance between two facilities.					
Select for distance to installation/base transit systems and access to pedestrian ways and bike paths.			OK. Interior walks and biking paths are a requirement of the RFP. Bus stops are also a requirement of the RFP.		
Select for development previously used or developed suitable and available sites.			OK. Site was previously developed as a golf course - this is an increase of density.		
1.C2 Installation/Base Urban Redevelopment	2	0			0
Increase localized density to conform to existing or desired density goals by utilizing sites that are located within existing cantonment areas of high development density. (1)					
Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure. (1)					
1.C3 Brownfield Redevelopment	1	0			0
Develop on a site classified as a brownfield and provide remediation as required by EPA's Brownfield Redevelopment program requirements OR Develop a brownfield site (a site that has been contaminated by previous uses). (1)			Site has been determined not to be a brownfield per COE Architect Doug Pohl and Mr. Richard Schneider of USACE Sustainability Center of Expertise.		
1.C4 Alternative Transportation	4	1			0
Locate building within ½ mile of installation/base transit systems. (1)		1	OK. Per Mr. Schneider, "The extent to which the plan 'accommodates' a future transit system, even to the point of constructing bus stop shelters, pull-outs, etc., should be taken in consideration in justifying the point. If in your case, the school bus stops would accommodate a future transit system, I'd recommend the point." Bus stops are a requirement of the RFP.		

SUSTAINABLE PROJECT RATING TOOL - FORT KNOX

26-Nov-2003

FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants. (1)						
Locate building within 2 miles of alternative-fuel refueling station(s). (1)			0			
Size parking capacity not to exceed minimum installation/base cantonment requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants. (1)			N/A			
1.C5	Reduced Site Disturbance	2	1			0
On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the remaining open area by planting native or adapted vegetation. (1)						
Reduce the development footprint (including building, access roads and parking) to exceed the installation/base's/base's master plan local zoning's open space requirement for the site by 25% or in accordance with installation/base policy on open space set asides, whichever is greater. (1)			1	OK. Reduce the development footprint to exceed the installation/base's/base's master plan local zoning's open space requirement for the site by 25%.		
1.C6	Storm water Management	2	2			0

SUSTAINABLE PROJECT RATING TOOL - FORT KNOX

26-Nov-2003

FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Implement a stormwater management plan that results in:					
No net increase in the rate or quantity of stormwater runoff from undeveloped to developed conditions; OR, if existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff. (1)		1	OK. No net increase is a requirement of the RFP.		
Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA-840-B-92-002 1/93). (1)		1			
1.C7 Landscape and Exterior Design to Reduce Heat Islands	2	2			0
Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/ high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces, OR place a minimum of 50% of parking space under-ground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area. (1)		1	Possible. Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc.		
Use ENERGY STAR Roof compliant, high-reflectance AND low emissivity roofing (initial reflectance of at least .65 and three-year-aged reflectance of at least .5 when tested in accordance with ASTM E408) for a minimum of 75% of the roof surface; OR, install a "green" (vegetated) roof for at least 50% of the roof area. (1)		1	Possible. Provide ENERGY STAR Roof compliant, high-reflectance AND low emissivity roofing.		
1.C8 Light Pollution Reduction	1	1			0

SUSTAINABLE PROJECT RATING TOOL - FORT KNOX

26-Nov-2003

FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Do not exceed Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site. (1)		1	OK. Providing fixtures throughout that produce downward lighting so as to prevent light pollution of adjacent residents and off site.		
1.C9 Optimize Site Features	1	1			0
Perform both of the following: (1)		1			
Maximize the use of free site energy.			Possible. Consider designing buildings oriented for southern exposure and maintaining existing vegetation for windbreaks.		
Plan facility, parking and roadways to "fit" existing site contours and limit cut and fill.			Possible. Consider the design of a balanced site with minimal spoilage.		
1.C10 Facility Impact	2	1			0
Cluster facilities to reduce impact, access distance to utilities and sufficient occupant density to support mass transit. (1)					
Collaborate with installation/base and community planners to identify and mitigate potential impacts of the project beyond site boundaries, and transportation planners to insure efficient public transport. (1)		1	Possible. Consider the future widening of Wilson as well as the integration with future development parcels. Consider the use proper planning and design techniques to minimize negative impacts on the site and on neighboring properties and structures.		
1.C11 Site Ecology	1	1			0
Develop site environmental management and mitigation plan. (1)		1	Possible. The RFP recommends the preservation and enhancement of existing trees, ecosystems, and habitats. The RFP requires that 85% of identified significant trees on the site be preserved. Consider the preservation of 95% of significant trees.		
2.0 Water Efficiency (W)	5	3			0
2.C1 Water Efficient Landscaping	2	1			0

SUSTAINABLE PROJECT RATING TOOL - FORT KNOX

26-Nov-2003

FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means. (1)						
Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems. (1)			1	OK. No irrigation is to be provided for this project.		
2.C2	Innovative Wastewater Technologies	1	0			0
Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards. (1)						
2.C3	Water Use Reduction	2	2			0
Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act (EPACT) of 1992 fixture performance requirements. (1)			1	Possible. Consider the use of low-volume flush toilets, restricted flow shower heads, high-efficiency garbage disposals and dishwashers that minimize water use.		
Exceed the potable water use reduction by an additional 10% (30% total efficiency increase). (1)			1	Possible. Same as above but additional percent increase.		
3.0	Energy and Atmosphere (E)	28	9			0
3.R1	Fundamental Building Systems Commissioning	Req'd.				
Implement all of the following fundamental best practice commissioning procedures.				Required by SPiRiT rating.		
Engage a commissioning authority.				Required by SPiRiT rating.		
Develop design intent and basis of design documentation.				Required by SPiRiT rating.		
Include commissioning requirements in the construction documents.				Required by SPiRiT rating.		
Develop and utilize a commissioning plan.				Required by SPiRiT rating.		
Verify installation, functional performance, training and documentation.				Required by SPiRiT rating.		
Complete a commissioning report.				Required by SPiRiT rating.		
3.R2	Minimum Energy Performance	Req'd.				
Design to meet building energy efficiency and performance as required by TI 800-01 (Design Criteria).				Required by SPiRiT rating.		
3.R3	CFC Reduction in HVAC&R Equipment	Req'd.				

SUSTAINABLE PROJECT RATING TOOL - FORT KNOX

26-Nov-2003

FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.				Required by SPiRiT rating.		
3.C1	Optimize Energy Performance	20	8			0
Reduce design energy usage (DEU) compared to the energy use budget (EUB) in joules per square meter per year for regulated energy components as described in the requirements of Chapter 11 of the TI 800-01 (Design Criteria), as demonstrated by a whole building simulation.				Possible. Consider the use of ENERGY STAR rated appliances in obtaining these points.		
1 Point will be awarded for every reduction in design energy use of 2.5% for both new and existing facilities for a maximum score of 20 points. (20)				Possible. This requires a variable percentage reduction from baseline. This will depend on the proposer and their ability to meet the requirement of TI 801-01 as well as being able to demonstrate a whole building simulation. The use of ENERGY STAR appliances will help in reducing design energy usage. These points will vary depending on overall strategy employed. The points can vary from 1-20. Provide Geothermal Heat Pumps as required by the RFP. These points can be obtained by using an overall design strategy and not just one specific strategy.		
Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE			8	Possible. Consider the use of ENERGY STAR rated appliances in obtaining these points.		
3.C2	Renewable Energy	4	0			0
Supply a net fraction of the building's total energy use through the use of on-site renewable energy systems.				This point is not applicable for this RFP. There are no alternative power sources available.		
% of Total Annual Energy Usage in Renewables						
5% = 1						
10% = 2						
15% = 3						
20% = 4						
3.C3	Additional Commissioning	1	1			0

SUSTAINABLE PROJECT RATING TOOL - FORT KNOX

26-Nov-2003

FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks: (1)		1	OK. The RFP requires additional commissioning for all units. The mechanical specification should provide language for building commissioning in addition to the requirements in the Statement of Work.		
1. Conduct a focused review of the design prior to the construction documents phase.					
2. Conduct a focused review of the construction documents when close to completion.					
3. Conduct a selective review of contractor submittals of commissioned equipment.					
4. Develop a system and energy management manual.					
5. Have a contract in place for a near-warranty end or post occupancy review.					
Items 1, 2, and 3 must be performed by someone other than the designer.					
3.C4 Elimination of HCFC's and Halons (DELETED)					
3.C5 Measurement and Verification	1	0			0
Comply with the installed equipment requirements for continuous metering as stated in selected Measurement and Verification Methods - Option B: Retrofit Isolation of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following: (1)		N/A			
Lighting systems and controls.					
Constant and variable motor loads.					
Variable frequency drive (VFD) operation.					
Chiller efficiency at variable loads (kW/ton).					
Cooling load.					
Air and water economizer and heat recovery cycles.					
Air distribution static pressures and ventilation air volumes.					
Boiler efficiencies.					
Building specific process energy efficiency systems and					
Indoor water risers and outdoor irrigation systems.					
3.C6 Green Power	1	0			0
Engage in a two year contract to purchase the amount of power equal to projected building consumption generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements. (1)		N/A			
3.C7 Distributed Generation	1	0			0

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Reduce total energy usage and emissions by considering source energy implications and local cogeneration and direct energy conversion. Generate at least 50% of the building's projected annual consumption by on-site distributed generation sources. (1)			N/A			
4.0 Materials and Resources (M)		13	8			0
4.R1 Storage & Collection of Recyclable		Req'd.				
Provide an easily accessible area that serves the entire building that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.				Required by SPiRiT rating. Provide an in-residence recycling storage/collection area preferably near the garbage bin area. Provide a dedicated area in the garage.		
4.C1 Building Reuse		3	0			0
Reuse large portions of existing structures during renovation or redevelopment projects.						
Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies). (1)			N/A			
Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing excluding window assemblies). (1)			N/A			
Maintain 100% of existing building structure and shell AND 50% non-shell (walls, floor coverings, and ceiling systems). (1)			N/A			
4.C2 Construction Waste Management		2	1			0
Develop and implement a waste management plan, quantifying material diversion by weight:						
Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste. (1)			1	Possible. Consider specifying targets to be achieved by the Contractor. Consider salvaging material during the demolition of Binter Court neighborhood and the Golf Cart Maintenance building.		
Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris. (1)						
4.C3 Resource Reuse		2	1			0
Specify salvaged or refurbished materials for 5% of building materials. (1)			1	Possible. Consider specifying targets to be achieved by the Contractor. Use of salvaged or refurbished material shall be specified.		
Specify salvaged or refurbished materials for 10% of building materials. (1)						

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
4.C4	Recycled Content	2	2			0
	Specify a minimum of 25% of building materials that contain in aggregate a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. (1)		1	Possible. Consider specifying the use of steel, concrete, aluminum doors/windows, etc. that denote recycled content. RFP Requirement - incorporate into specifications for floors, cabinets, etc. Use products such as trex recycled plastic in lieu of wood at fencing/screening. Consider specifying plantation grown woods.		
	Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimum weighted average of 20% post consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. (1)		1	Possible. Consider specifying recycled content items: steel, concrete aggregate, wall board, etc.		
4.C5	Local/Regional Materials	2	2			0
	Specify a minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles. (1)		1	Possible. Consider specifying and purchasing locally or regionally manufactured materials.		
	Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles. (1)		1	Possible. Same as above but additional percent increase.		
4.C6	Rapidly Renewable Materials	1	1			0
	Specify rapidly renewable building materials for 5% of total building materials.(1)		1	Possible. Consider using bamboo flooring and other rapidly renewable products.		
4.C7	Certified Wood	1	1			0
	Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines for wood building components including but not limited to framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers.(1)		1	Possible. Consider the use of materials or products approved by the Forestry Stewardship Council for wood building components.		
5.0 Indoor Environmental Quality (IEQ) (Q)		17	13			0
5.R1.	Minimum IAQ Performance	Req'd.				
	Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda			Required by the SPiRiT rating.		
5.R2	Environmental Tobacco Control (ETS) Control	Req'd.				

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, by providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge). Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.			Required by the SPiRiT rating.		
5.C1 IAQ Carbon Dioxide (CO2) Monitoring	1	0			0
Install a permanent carbon dioxide (CO2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time. (1)					
5.C2 Increase Ventilation Effectiveness	1	1			0
For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to 0.9 as determined by ASHRAE(1)29-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy. (1)		1	Possible. Consider provisions in the mechanical design and specification for obtaining this point. This should be verified using the techniques outlined in ASHRAE(1)29-1997.		
5.C3 Construction IAQ Management Plan	2	2			0
Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:					

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy (Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999). (1)		1	Possible. The Design-Build Team should work together to incorporate best management practices during construction and provide a Construction Indoor Air Quality Management Plan.		
Conduct a minimum two-week building flushout with new filtration media at 100% outside air after construction ends and prior to occupancy, OR, conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445. (1)		1	Possible. The Design-Build Team should work together to incorporate best management practices during construction and ensure that a flushout is performed according to the guidelines of 5.C3.		
5.C4 Low-Emitting Materials	4	3			0
Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:					
Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51. (1)		1	Possible. Consider specifying targets to be achieved by the Contractor. These targets must meet or exceed VOC limits in 5.C4.		
Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements. (1)		1	Possible. Consider specifying and using paint products and coatings that meet or exceed the VOC and chemical component limits of Green Seal requirements. A manufacturer's Safety and Data Sheet should be provided as well as a product sample for each product used.		
Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. (1)		N/A			
Composite wood or agrifiber products must contain no added urea-formaldehyde resins. (1)		1	Possible. Consider using products that contain no added urea-formaldehyde resins of other low- or non-VOC emitting products.		
5.C5 Indoor Chemical and Pollutant Source Control	1	1			0
Design to minimize cross-contamination of regularly occupied areas by chemical pollutants: (1)		1	Possible. Consider having a post construction ventilation for the entire building for each unit.		

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs			Possible. Avoid exposure of the residents to potentially hazardous chemicals that adversely impact air quality. Consider the design of a separate storage area, preferably an exterior storage, that is not adjacent to ventilation systems. This area would need separate ventilation. Educate residents in proper handling and storage of harmful chemicals.		
5.C6 Controllability of Systems	2	2			0
Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall. (1)		1	Possible. Operable windows are a requirement of the RFP.		
Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas. (1)		1	Possible. Consider providing task lighting, motion sensors, light level sensors. Consider providing individual or integrated control systems that control lighting, airflow, and temperature in individual rooms.		
5.C7 Thermal Comfort	2	1			0
Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. (1)		1	Possible. Consider designing unit HVAC to comply.		
Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building.(1)		N/A			
5.C8 Daylight and Views	2	2			0
Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight. (1)		1	Possible. Consider designing windows to meet requirement.		
Direct line of sight to vision glazing from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. (1)		1	Possible. Consider designing windows to meet requirement.		

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
5.C9	Acoustic Environmental/Noise Control	1	1			0
	Minimize environmental noise through appropriate use of insulation, sound-absorbing materials and noise source isolation. (1)		1	Possible. Consider specifying wall insulation and materials and subflooring that have better acoustical ratings. Also consider designs that create noise-source isolation (i.e., house keeping pads that isolate vibrations created by mechanical systems).		
5.C10	Facility In-Use IAQ Management Plan	1	0			0
	Perform all of the following: (1)					
	Develop an air quality action plan to include scheduled HVAC system cleaning.					
	Develop an air quality action plan to include education of occupants and facility managers on indoor pollutants and their roles in preventing them.					
	Develop an air quality action plan to include permanent monitoring of supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO 2), total volatile organic compounds (TVOCs), and particulates (including PM10).					
6.0	Facility Delivery Process (P)	7	7			0
6.C1	Holistic Delivery of Facility	7	7			0
	Choose team leaders that are experienced in holistic delivery of facilities. (1)		1	Possible. Preparation of the RFP complied with all of these Section 6.C1 factors. Consider continuing compliance during completion of the project design.		
	Train the entire team in the holistic delivery process. The team must include all stakeholders in the facility delivery, including the users, the contracting staff, the construction representatives, project manager, and design/engineering team members. (1)		1	Possible. Team training should be done after award and prior to construction.		
	Identify project goals and metrics. (1)		1	Possible. Identifying project goals and metrics should be done after award and prior to construction.		
	Plan and execute charrettes with team members at critical phases of the facility delivery. (1)		1	Possible. Design Reviews can serve as charettes if organized properly.		
	Identify and resolve tradeoffs among sustainability, first costs, life cycle costs and mission requirements through charrettes and other collaborative processes. (2)		2	OK. As design is completed, tradeoffs among sustainability, first cost, life cycle costs and mission requirements can be compared.		

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Document required results for each phase of project deliverables that achieve the project goals and are measurable throughout the facility life span. (1)			1	Possible. Documentation would need to be provided during each phase of the project.		
7.0 Current Mission		6	4			0
7.C1 Operation and Maintenance		3	3			0
Develop a facility operations and maintenance program to include: (2)			2	Possible. Consider providing the necessary materials to help educate the residents along with the housing managers and maintenance personnel. A facility operations and maintenance program should be done in conjunction with the housing managers and maintenance personnel prior to project closeout.		
Commissioning instructions for all facility systems.						
Comprehensive facility operations and maintenance instructions for system operation, performance verification procedures and results, an equipment inventory, warranty information, and recommended maintenance schedule. The instructions should include a comprehensive, preventive maintenance program to keep all facility systems functioning as designed.						
A periodic training program for occupants, facilities managers, and maintenance staff in all facility operations and maintenance activities.						
Instructions on sustainable cleaning and pest control practices.						
Develop a comprehensive site/facility recycling/waste management plan.						
Provide surfaces, furnishings, and equipment that are appropriately durable, according to life cycle cost analysis. (1)			1	Possible. Consider specifying, during the design phase, and providing, during the construction phase, the use of surfaces, furnishings, and appropriately durable items according to a life cycle cost analysis.		
7.C2 Design for Soldier and Workforce Productivity and Retention		3	1			0
Provide a high quality indoor environment to enhance user/occupant quality of life (QOL). (1)			1	OK. RFP requires a high quality environment.		
Provide a highly functional work environment to promote user/occupant work productivity. (1)			N/A			
Provide a healthy and safe work environment to sustain QOL and productivity. (1)			N/A			
8.0 Future Missions		4	2			0
8.C1 Assess the Life Span of the Designed Use and Supporting Systems		2	2			0

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Identify how long the designed function is likely to occupy the current facility. (1)		1	Possible. Consider assessing the life span of the designed use and supporting systems of this project by identifying these items during the design and construction phases of the project.		
Identify how long the envelope, structure, HVAC, plumbing, communications, electrical, and other systems are likely to last before requiring replacement or upgrade. Consider economic, functional and physical obsolescence. (1)		1	Possible. Consider assessing the life span of the designed use and supporting systems of this project by identifying how long the envelope, structure, HVAC, plumbing, communications, electrical and other systems will last before requiring replacement or upgrades. Consider providing information regarding life spans of the listed items in the Operations and Maintenance manuals.		
8.C2 Design for Adaption, Renewal and Future Uses	2	0			0
Identify possible future uses for the facility; consider alternatives that expand the list of possible future uses. AND Design the building to accommodate as wide a range of future uses, as practical. AND Design the installation of building systems to accommodate foreseeable change with a minimum amount of disruption, cost, and additional materials. (1)		N/A			
Build the smallest facility necessary to meet current mission functional requirements, using the most efficient shape and form, while taking into consideration expansion capabilities and potential future mission requirements. AND Design the facility for recycling of materials and systems. (1)		N/A			
TOTALS	100	58	GOLD		0

ATTACHMENT 14

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
1.0	Sustainable Sites (S)	20	0			0
1.R1	Erosion, Sedimentation and Water Quality Control	Req'd.	-			
	Design a site sediment and erosion control plan and a pollution prevention plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-833-R-92-00(1), Chapter 3, OR local Erosion and Sedimentation Control standards and codes, whichever is more stringent. The plan shall meet the following objectives:			Required by SPiRiT rating.		
	Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.			Required by SPiRiT rating.		
	Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter			Required by SPiRiT rating.		
	Prevent hazardous material discharge into storm water systems.			Required by SPiRiT rating. Use only natural ("green") fertilizers.		
	Prevent petroleum oils and lubricants (POL) discharge into storm water systems.			Required by SPiRiT rating.		
1.C1	Site Selection	2	0			0
	Do not develop buildings on portions of sites that meet any one of the following criteria: (1)					
	Prime training or maneuver land.					
	Land whose elevation is lower than 5 ft. above the (1)00-year flood elevation as defined by FEMA.					
	Land that provides habitat for any species on the Federal or State threatened or endangered list.					
	Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233 and Part 22, OR as defined by local or state rule or law, whichever is more stringent.					

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Select site based on functional adjacencies/relationships and land use compatibility. (1)					
Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure.					
Select site in area of high density					
Site facilities based on the strength of their relationships to other facilities/land-uses to limit travel distances. The stronger the relationship/functional interaction, the closer the distance between two facilities.					
Select for distance to installation/base transit systems and access to pedestrian ways and bike paths.					
Select for development previously used or developed suitable and available sites.					
1.C2 Installation/Base Urban Redevelopment	2	0			0
Increase localized density to conform to existing or desired density goals by utilizing sites that are located within existing cantonment areas of high development density. (1)					
Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure. (1)					
1.C3 Brownfield Redevelopment	1	0			0
Develop on a site classified as a brownfield and provide remediation as required by EPA's Brownfield Redevelopment program requirements OR Develop a brownfield site (a site that has been contaminated by previous uses). (1)					
1.C4 Alternative Transportation	4	0			0
Locate building within ½ mile of installation/base transit systems. (1)					

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants. (1)						
Locate building within 2 miles of alternative-fuel refueling station(s). (1)						
Size parking capacity not to exceed minimum installation/base cantonment requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants. (1)						
1.C5	Reduced Site Disturbance	2	0			0
On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the remaining open area by planting native or adapted vegetation. (1)						
Reduce the development footprint (including building, access roads and parking) to exceed the installation/base's/master plan local zoning's open space requirement for the site by 25% or in accordance with installation/base policy on open space set asides, whichever is greater. (1)						
1.C6	Storm water Management	2	0			0

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Implement a stormwater management plan that results in:					
No net increase in the rate or quantity of stormwater runoff from undeveloped to developed conditions; OR, if existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff. (1)					
Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA-840-B-92-002 1/93). (1)					
1.C7 Landscape and Exterior Design to Reduce Heat Islands	2	0			0
Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/ high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces, OR place a minimum of 50% of parking space under-ground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area. (1)					
Use ENERGY STAR Roof compliant, high-reflectance AND low emissivity roofing (initial reflectance of at least .65 and three-year-aged reflectance of at least .5 when tested in accordance with ASTM E408) for a minimum of 75% of the roof surface; OR, install a "green" (vegetated) roof for at least 50% of the roof area. (1)					
1.C8 Light Pollution Reduction	1	0			0

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Do not exceed Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site. (1)						
1.C9	Optimize Site Features	1	0			0
Perform both of the following: (1)						
Maximize the use of free site energy.						
Plan facility, parking and roadways to "fit" existing site contours and limit cut and fill.						
1.C10	Facility Impact	2	0			0
Cluster facilities to reduce impact, access distance to utilities and sufficient occupant density to support mass transit. (1)						
Collaborate with installation/base and community planners to identify and mitigate potential impacts of the project beyond site boundaries, and transportation planners to insure efficient public transport. (1)						
1.C11	Site Ecology	1	0			0
Develop site environmental management and mitigation plan. (1)						
2.0	Water Efficiency (W)	5	0			0
2.C1	Water Efficient Landscaping	2	0			0

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means. (1)						
Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems. (1)						
2.C2	Innovative Wastewater Technologies	1	0			0
Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards. (1)						
2.C3	Water Use Reduction	2	0			0
Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act (EPACT) of 1992 fixture performance requirements. (1)						
Exceed the potable water use reduction by an additional 10% (30% total efficiency increase). (1)						
3.0	Energy and Atmosphere (E)	28	0			0
3.R1	Fundamental Building Systems Commissioning	Req'd.				
Implement all of the following fundamental best practice commissioning procedures.				Required by SPiRiT rating.		
Engage a commissioning authority.				Required by SPiRiT rating.		
Develop design intent and basis of design documentation.				Required by SPiRiT rating.		
Include commissioning requirements in the construction documents.				Required by SPiRiT rating.		
Develop and utilize a commissioning plan.				Required by SPiRiT rating.		
Verify installation, functional performance, training and documentation.				Required by SPiRiT rating.		
Complete a commissioning report.				Required by SPiRiT rating.		
3.R2	Minimum Energy Performance	Req'd.				
Design to meet building energy efficiency and performance as required by TI 800-01 (Design Criteria).				Required by SPiRiT rating.		
3.R3	CFC Reduction in HVAC&R Equipment	Req'd.				

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.				Required by SPiRiT rating.		
3.C1	Optimize Energy Performance	20	0			0
Reduce design energy usage (DEU) compared to the energy use budget (EUB) in joules per square meter per year for regulated energy components as described in the requirements of Chapter 11 of the TI 800-01 (Design Criteria), as demonstrated by a whole building simulation.						
1 Point will be awarded for every reduction in design energy use of 2.5% for both new and existing facilities for a maximum score of 20 points. (20)						
Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE						
3.C2	Renewable Energy	4	0			0
Supply a net fraction of the building's total energy use through the use of on-site renewable energy systems.						
% of Total Annual Energy Usage in Renewables						
5% = 1						
10% = 2						
15% = 3						
20% = 4						
3.C3	Additional Commissioning	1	0			0

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks: (1)					
1. Conduct a focused review of the design prior to the construction documents phase.					
2. Conduct a focused review of the construction documents when close to completion.					
3. Conduct a selective review of contractor submittals of commissioned equipment.					
4. Develop a system and energy management manual.					
5. Have a contract in place for a near-warranty end or post occupancy review.					
Items 1, 2, and 3 must be performed by someone other than the designer.					
3.C4 Elimination of HCFC's and Halons (DELETED)					
3.C5 Measurement and Verification	1	0			0
Comply with the installed equipment requirements for continuous metering as stated in selected Measurement and Verification Methods - Option B: Retrofit Isolation of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following: (1)					
Lighting systems and controls.					
Constant and variable motor loads.					
Variable frequency drive (VFD) operation.					
Chiller efficiency at variable loads (kW/ton).					
Cooling load.					
Air and water economizer and heat recovery cycles.					
Air distribution static pressures and ventilation air volumes.					
Boiler efficiencies.					
Building specific process energy efficiency systems and					
Indoor water risers and outdoor irrigation systems.					
3.C6 Green Power	1	0			0
Engage in a two year contract to purchase the amount of power equal to projected building consumption generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements. (1)					
3.C7 Distributed Generation	1	0			0

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Reduce total energy usage and emissions by considering source energy implications and local cogeneration and direct energy conversion. Generate at least 50% of the building's projected annual consumption by on-site distributed generation sources. (1)						
4.0 Materials and Resources (M)		13	0			0
4.R1 Storage & Collection of Recyclable		Req'd.				
Provide an easily accessible area that serves the entire building that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.				Required by SPiRiT rating.		
4.C1 Building Reuse		3	0			0
Reuse large portions of existing structures during renovation or redevelopment projects.						
Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies). (1)						
Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing excluding window assemblies). (1)						
Maintain 100% of existing building structure and shell AND 50% non-shell (walls, floor coverings, and ceiling systems). (1)						
4.C2 Construction Waste Management		2	0			0
Develop and implement a waste management plan, quantifying material diversion by weight:						
Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste. (1)						
Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris. (1)						
4.C3 Resource Reuse		2	0			0
Specify salvaged or refurbished materials for 5% of building materials. (1)						
Specify salvaged or refurbished materials for 10% of building materials. (1)						

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
4.C4	Recycled Content	2	0			0
	Specify a minimum of 25% of building materials that contain in aggregate a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. (1)					
	Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimum weighted average of 20% post consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. (1)					
4.C5	Local/Regional Materials	2	0			0
	Specify a minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles. (1)					
	Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles. (1)					
4.C6	Rapidly Renewable Materials	1	0			0
	Specify rapidly renewable building materials for 5% of total building materials.(1)					
4.C7	Certified Wood	1	0			0
	Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines for wood building components including but not limited to framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers.(1)					
5.0	Indoor Environmental Quality (IEQ) (Q)	17	0			0
5.R1.	Minimum IAQ Performance	Req'd.				
	Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda			Required by the SPiRiT rating.		
5.R2	Environmental Tobacco Control (ETS) Control	Req'd.				

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, by providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge). Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.			Required by the SPiRiT rating.		
5.C1 IAQ Carbon Dioxide (CO2) Monitoring	1	0			0
Install a permanent carbon dioxide (CO2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time. (1)					
5.C2 Increase Ventilation Effectiveness	1	0			0
For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to 0.9 as determined by ASHRAE(1)29-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy. (1)					
5.C3 Construction IAQ Management Plan	2	0			0
Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:					

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy (Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999). (1)					
Conduct a minimum two-week building flushout with new filtration media at 100% outside air after construction ends and prior to occupancy, OR, conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445. (1)					
5.C4 Low-Emitting Materials	4	0			0
Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:					
Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51. (1)					
Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements. (1)					
Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. (1)					
Composite wood or agrifiber products must contain no added urea-formaldehyde resins. (1)					
5.C5 Indoor Chemical and Pollutant Source Control	1	0			0
Design to minimize cross-contamination of regularly occupied areas by chemical pollutants: (1)					

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs						
5.C6	Controllability of Systems	2	0			0
Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall. (1)						
Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas. (1)						
5.C7	Thermal Comfort	2	0			0
Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. (1)						
Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building.(1)						
5.C8	Daylight and Views	2	0			0
Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight. (1)						
Direct line of sight to vision glazing from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. (1)						

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
5.C9	Acoustic Environmental/Noise Control	1	0			0
	Minimize environmental noise through appropriate use of insulation, sound-absorbing materials and noise source isolation. (1)					
5.C10	Facility In-Use IAQ Management Plan	1	0			0
	Perform all of the following: (1)					
	Develop an air quality action plan to include scheduled HVAC system cleaning.					
	Develop an air quality action plan to include education of occupants and facility managers on indoor pollutants and their roles in preventing them.					
	Develop an air quality action plan to include permanent monitoring of supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO 2), total volatile organic compounds (TVOCs), and particulates (including PM10).					
6.0	Facility Delivery Process (P)	7	0			0
6.C1	Holistic Delivery of Facility	7	0			0
	Choose team leaders that are experienced in holistic delivery of facilities. (1)					
	Train the entire team in the holistic delivery process. The team must include all stakeholders in the facility delivery, including the users, the contracting staff, the construction representatives, project manager, and design/engineering team members. (1)					
	Identify project goals and metrics. (1)					
	Plan and execute charrettes with team members at critical phases of the facility delivery. (1)					
	Identify and resolve tradeoffs among sustainability, first costs, life cycle costs and mission requirements through charrettes and other collaborative processes. (2)					

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FACILITY SUMMARY POINTS		Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Document required results for each phase of project deliverables that achieve the project goals and are measurable throughout the facility life span. (1)						
7.0 Current Mission		6	0			0
7.C1 Operation and Maintenance		3	0			0
Develop a facility operations and maintenance program to include: (2)						
Commissioning instructions for all facility systems.						
Comprehensive facility operations and maintenance instructions for system operation, performance verification procedures and results, an equipment inventory, warrantee information, and recommended maintenance schedule. The instructions should include a comprehensive, preventive maintenance program to keep all facility systems functioning as designed.						
A periodic training program for occupants, facilities managers, and maintenance staff in all facility operations and maintenance activities.						
Instructions on sustainable cleaning and pest control practices.						
Develop a comprehensive site/facility recycling/waste management plan.						
Provide surfaces, furnishings, and equipment that are appropriately durable, according to life cycle cost analysis. (1)						
7.C2 Design for Soldier and Workforce Productivity and Retention		3	0			0
Provide a high quality indoor environment to enhance user/occupant quality of life (QOL). (1)						
Provide a highly functional work environment to promote user/occupant work productivity. (1)						
Provide a healthy and safe work environment to sustain QOL and productivity. (1)						
8.0 Future Missions		4	0			0
8.C1 Assess the Life Span of the Designed Use and Supporting Systems		2	0			0

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FACILITY SUMMARY POINTS	Max. Points	Team Goals	Action/Status	Responsibility	Points Status
Identify how long the designed function is likely to occupy the current facility. (1)					
Identify how long the envelope, structure, HVAC, plumbing, communications, electrical, and other systems are likely to last before requiring replacement or upgrade. Consider economic, functional and physical obsolescence. (1)					
8.C2 Design for Adaption, Renewal and Future Uses	2	0			0
Identify possible future uses for the facility; consider alternatives that expand the list of possible future uses. AND Design the building to accommodate as wide a range of future uses, as practical. AND Design the installation of building systems to accommodate foreseeable change with a minimum amount of disruption, cost, and additional materials. (1)					
Build the smallest facility necessary to meet current mission functional requirements, using the most efficient shape and form, while taking into consideration expansion capabilities and potential future mission requirements. AND Design the facility for recycling of materials and systems. (1)					
TOTALS	100	0			0

FINAL DRAFT

Sustainable Project Rating Tool (SPiRiT)

Version 2.0

Based on the U.S. Green Building Council (USGBC)
LEEDTM 2.1 [Leadership in Energy and Environmental Design]
Green Building Rating System

APRIL 2003

U.S. Army Corps of Engineers

U. S. Army Assistant Chief of Staff for Installation Management

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NOTES

- 1) The Sustainable Project Rating Tool (SPiRiT) is a U. S. Army Corps of Engineers (USACE) developed tool prepared for the Army Chief of Staff for Installation Management (ACSIM) to insure that all future facilities be designed and built according to sustainable principles. SPiRiT is derived from the U. S. Green Building Council LEED™ 2.1 (Leadership in Energy and Environmental Design) Green Building Rating System. USACE has a licensed agreement with the U. S. Green Building Council (USGBC) permitting use of LEED™ 2.1 as part of SPiRiT.
- 2) SPiRiT is a self-evaluation system, which allows the rating of new and existing facilities by project teams made up of key stakeholders. Project Teams self-evaluate and self-certify projects based on the total credits earned. For classification as a Green building, facilities must satisfy all of the prerequisites and a minimum of 25 credit points. See U.S. Army Corps of Engineers Technical Letter (ETL) 1110-3-491, 1 May 2001, *Sustainable Design for Military Facilities*, and current directives for further guidance and policy.
- 3) The SPiRiT numbering scheme parallels, but does not match LEED 2.1. LEED does not number major sections, which it calls 'Credit Categories,' ex. 'Sustainable Sites,' rather it numbers criteria or 'credits' within each major section. SPiRiT credit numbers match those of LEED where there is a 1:1 comparison. Where additional credits have been added they fall at the end of major sections.
- 4) The SPiRiT Credits all follow the format: Intent, Requirement, Suggested Documentation, and Technologies/Strategies.
 - Intent: A statement of the primary goal for the credit;
 - Requirement: Quantifiable conditions necessary to achieve stated intent;
 - Suggested Documentation: Recommended documentation to validate credit attainment.
 - Technologies/Strategies: Suggested technologies, strategies and referenced guidance on the means to achieve identified requirements.
- 5) Projects are evaluated for each SPiRiT credit which are either 'Prerequisites' or result in a point score:
 - Prerequisites: These credits are a statement of minimum requirements that must be met. No certification is possible unless all listed prerequisites are achieved. These credits are recognizable by an 'R' in the number scheme, ex. 1.R1, and a 'Reqd.' in the score column.
 - Point Score: These credits are evaluated to determine a point score. No partial points are granted.
- 6) SPiRiT Sustainable Project Certification Levels:

SPiRiT Bronze	25 to 34 Points
SPiRiT Silver	35 to 49 Points
SPiRiT Gold	50 to 74 Points
SPiRiT Platinum	75 to 100 Points
- 6) SPiRiT credits have been developed to address facility life cycle phases including programming, design, construction, and commissioning. Additional rating tools will be developed to address installation/base master planning and facilities operations and maintenance, rehabilitation, recycling, and disposal.
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- 10) Army/USACE employees are members of the USGBC with membership privileges accessible via the USGBC web site, <http://www.usgbc.org>. For information on membership and access to available LEED resources to support use of SPiRiT and sustainable design in your projects, contact Richard Schneider at (217) 373-6752 or richard.l.schneider@erdc.usace.army.mil (Annette Stumpf at (217) 352-6511 ext. 7542 or annette.l.stumpf@erdc.usace.army.mil, alternate).
- 11) For the latest information on SPiRiT and for access to guidance, tools and resources supporting sustainable design initiatives, visit the CERL 'Sustainable Design and Development Resource' website, <http://www.cecer.army.mil/SustDesign>. There you may also join the CERL Sustainable Design ListServ to be directly notified of information pertinent to sustainable design.

1.0	Sustainable Sites	Score	20
1.R1	Erosion, Sedimentation, and Water Quality Control ⁽¹⁾	Reqd.	
Intent:	Control erosion and pollutants to reduce negative impacts on water and air quality.		
Requirement:	<div><input type="checkbox"/> Design, specific to a site, a sediment and erosion control plan that conforms to EPA Document No. EPA 832-R-92-005 (Stormwater Management for Construction Activities) OR local erosion and sedimentation control standards and codes, whichever is more stringent. The plan shall meet the following objectives:<ul style="list-style-type: none">▪ Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.▪ Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter.▪ Prevent hazardous material discharge into storm water systems.▪ Prevent petroleum oils and lubricants (POL) discharge into storm water systems.</div>		
Suggested Documentation:	<div><input type="checkbox"/> <i>Specifications:</i> Include the language and specifically the objectives from 1.R1 in the general conditions of the specifications under the following the CSI Master Format Section: 01570 Temporary Controls, and 02370 Erosion and Sedimentation Control.</div> <div><input type="checkbox"/> <i>Drawings:</i> Highlight erosion and sedimentation controls on the appropriate site plan sheet such as the Site Grading Plan, Site Demolition Plan, or Site Development Plan.</div> <div><input type="checkbox"/> <i>Design Analysis:</i> OR Prepare an Erosion and Sedimentation Control Plan to be included in the Design Analysis. Reference this plan in the general conditions sections of the specifications listed above.</div>		
Technologies /Strategies:	Adopt an erosion and sediment control plan for the project site during construction. Consider employing strategies such as temporary and permanent seeding, mulching, earth dikes, silt fencing, sediment traps, and sediment basins.		

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (Continued)

1.C1 Site Selection ⁽¹⁾

Intent: Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site. Select site based on functional adjacencies/relationships and land use compatibility.

Requirement: ☐ Do not develop buildings on portions of sites that meet any one of the following criteria: **1**

- Prime training or maneuver land.
- Land whose elevation is lower than 5 ft. above the 100-year flood elevation as defined by FEMA.
- Land that provides habitat for any species on the Federal or State threatened or endangered list.
- Within 100 feet of any water including wetlands as defined by 40 CFR, Parts 230-233 and Part 22, and isolated wetland or areas of special concern identified by state or local rule OR greater than distances given in state or local regulations as defined by local or state rule or law, whichever is more stringent.

Suggested Documentation: ☐ *Design Analysis:* Include a narrative describing the site selection process. Specifically mention endangered species, prime training lands or agricultural land, flood plain situation, and wetland situations for the site. When available, include FEMA maps, or USGS soil surveys maps.

Requirement ☐ Select site based on functional adjacencies/relationships and land use compatibility. **1**

- Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure.
- Select site in area of high density.
- Site facilities based on the strength of their relationships to other facilities/land-uses to limit travel distances. The stronger the relationship/functional interaction, the closer the distance between two facilities.
- Select for distance to installation/base transit systems and access to pedestrian ways and bike paths.
- Select for development previously used or developed suitable and available sites.

Suggested Documentation: ☐ *Design Analysis:* Include a narrative describing the functional adjacencies and the land use compatibility of the selected site. Specifically mention the sites integration with surrounding uses and connectivity to transit systems.

Technologies /Strategies: During the site selection process, give preference to those sites that do not include sensitive site elements and restrictive land types. Select a suitable building location and design the building with the minimal footprint to minimize site disruption. Strategies include stacking the building program, tuck-under parking, and sharing facilities with neighbors. Screen potential building sites for these criteria and/or ensure that these criteria are addressed by the designer during the conceptual design phase. Utilize landscape architects, ecologists, environmental engineers, civil engineers, and similar professionals for the screening process. New wetlands constructed as part of stormwater mitigation or other site restoration efforts are not affected by the restrictions of this credit.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (SS) (Continued)

1.C2 Installation/Base Redevelopment ⁽¹⁾

Intent: Channel development to installation/base cantonment areas with existing infrastructure, protecting greenfields and preserving habitat and natural resources.

Requirement: ☐ Increase localized density to conform to existing or desired density goals by utilizing sites that are located within existing cantonment areas of high development density. **1**

Suggested Documentation: ☐ *Design Analysis:* Describe the density goals for the project and discuss any density requirements from the installation/base Master Plan. Calculate the radius to include in the local density by multiplying 3 times the square root of the site square footage (See LEED Reference Guide for more details). Include a table showing all buildings that fall within this radius (in whole or in part) and give the building gross square footage, and site area. Sum all the square footages and divide the total building area by total site area. Discuss how the local density fits with the project density goals. OR Develop typical densities for various areas of the installation and then show that the new building contributes to an increase in the local density where it is sited.

Requirement: ☐ Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure. **1**

Suggested Documentation: ☐ *Design Analysis:* Include a narrative describing of existing infrastructure at the site such as roads and utilities, and how the proposed project will take advantage of these existing features. Indicate that neither construction costs nor O&M costs were required for major capacity expansions of utility systems or roads to meet the building loads and infrastructure requirements due to this project.

Technologies /Strategies: During the site selection process give preference to previously developed sites with installation/base cantonment redevelopment potential such as facility reduction program cleared sites.

1.C3 Contaminated Site Redevelopment ⁽¹⁾

Intent: Rehabilitate damaged sites where development is complicated by real or perceived environmental contamination, reducing pressure on undeveloped land.

Requirement: ☐ Develop on a site that has been documented as contaminated by the Defense Site Environmental Restoration Tracking System, or by means of an ASTM E1903-97 Phase II Environmental Site Assessment, or classified at the Local, State, or Federal level as a brownfield, and has been restored through remediation under the Installation Restoration Program or as required by EPA's Sustainable Redevelopment of Brownfields Program requirements. **1**

Suggested Documentation: ☐ *Specifications:* Include specific requirements for site remediation in the following CSI Master Format Section: 02200 Site Hazardous Materials Removal, and 02300 Site Decontamination.
☐ *Design Analysis:* For contaminated sites, include a Site Remediation Plan in accordance with the EPA's Brownfield Redevelopment program requirements. For previously remediated sites, include documentation from the site remediation that was performed showing compliance with the EPA standard mentioned or the Installation Restoration Program.

Technologies /Strategies: Screen potential damaged sites for these criteria prior to selection for rehabilitation. Utilize EPA OSWER Directive 9610.17 and ASTM Standard Practice E1739 for site remediation where required. Develop and implement a site remediation plan using strategies such as pump-and-treat, bioreactors, land farming, and in-situ remediation.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (SS) (Continued)

1.C4 Alternative Transportation ⁽¹⁾

Intent: Reduce pollution and land development impacts from automobile use.

Requirement:	<input type="checkbox"/> Locate building within ½ mile of installation/base transit systems.	1
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Describe the proximity to mass transit system in a design narrative. Specify the distance to bus stops or commuter rail, light rail, or subway stops.	
Requirement:	<input type="checkbox"/> For administrative, training, and other operational buildings, provide secure bicycle storage, with convenient changing/shower facilities (within the building or within 200 yards of the building), for 5% or more of regular building occupants. For residential buildings, provide covered storage facilities for securing bicycles for 15% or more of building occupants in lieu of changing/shower facilities.	1
Suggested Documentation:	<input type="checkbox"/> <i>Specifications:</i> Specify bike parking under one of the following CSI Master Format Sections: 05500 Metal Fabrications, and 11000 Equipment. <input type="checkbox"/> <i>Drawings:</i> Highlight bike parking on the Landscaping Plan, Site Development Plan, or equivalent plan. Include details for bike storage installation in the Site Details sheets. Also highlight the location of showers on the architectural plans. <input type="checkbox"/> <i>Design Analysis:</i> Provide calculations showing that bike storage and shower facilities are provided based on building type at the required level. The regular building occupant population is based on FTE. For training facilities only consider the permanent cadre. For residential buildings, it is based on permanent occupants. For multifunction buildings, consider each category of occupant and provide for each.	
Requirement:	<input type="checkbox"/> Provide alternative fuel vehicles for 3% of building occupants AND provide preferred parking for these vehicles, OR install alternative-fuel refueling stations for 3% of the total vehicle parking capacity of the site, OR locate building within 2 miles of alternative-fuel refueling station(s).	1
Suggested Documentation:	<input type="checkbox"/> <i>Drawing:</i> Show the number of parking spaces provided on the appropriate site plan drawing such as the Site Paving Plan, or Site Development Plan. Highlight alternative fuel vehicle preferred parking. <input type="checkbox"/> <i>Design Analysis:</i> Provide a narrative discussing the provision of alternative fuel vehicles, OR provide a narrative and/or a site map showing the location of the alternative-fuel refueling stations on-site, OR provide a narrative and/or a site map showing the location of the alternative-fuel station and the project and showing the distance between them.	
Requirement:	<input type="checkbox"/> Size the parking capacity not to exceed minimum installation/base cantonment requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, if no installation guidelines exist, size the parking capacity according to the minimum requirements by building typology as outlined in the Portland, Oregon Title 33 Planning and Zoning -Chapter 33.266 for Parking and Loading, Table 266-1 and 266-2 AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking and reduce the capacity of existing oversized parking for rehabilitation projects AND provide preferred parking for carpools or vanpools capable of serving 5% of the building occupants.	1
Suggested Documentation:	<input type="checkbox"/> <i>Drawings:</i> Show the number of parking spaces provided on the appropriate site plan drawing such as the Site Paving Plan, or Site Development Plan. Highlight preferred parking for carpools or vanpools. <input type="checkbox"/> <i>Design Analysis:</i> Include a narrative describing the source of the parking requirements and provide calculations demonstrating compliance with the minimum allowable requirements.	
Technologies /Strategies:	<p>Perform a transportation survey of future building occupants to identify transportation needs. Select sites near public installation/base transit served by safe, convenient pedestrian pathways. Design the building with transportation amenities such as bicycle racks and shower/changing facilities. Provide transportation amenities such as alternative fuel refueling stations and carpool/vanpool programs. Consider sharing the costs and benefits of refueling stations with adjacent buildings. Minimize parking lot/garage size. Consider sharing parking facilities with adjacent buildings.</p> <p>Referenced Standard: Portland, Oregon Title 33, Planning and Zoning – Chapter 33.266 Parking and Loading. The referenced chapter establishes standards for the amount of motor vehicle parking for areas of higher density and high quality public transit service. Other applicable installation policies may regulate other aspects of motor vehicle parking.</p>	

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (SS) (Continued)

1.C5 Reduced Site Disturbance ⁽¹⁾

Intent: Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirement: ☐ On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond constructed areas with pervious surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the site area (excluding the building footprint) by replacing impervious surfaces with native or adapted vegetation. Adjustment of the disturbed area is allowable consistent with force protection measures as long overall site disturbance is kept within 130% of the area defined by the site disturbance limits. 1

Suggested Documentation: ☐ *Specifications*: 01560 Temporary barriers and enclosures, 02230 Site Clearing, 02300 Earthwork
☐ *Drawings*:

- Show the boundary for site disturbance on the Site Grading Plan, Site Demolition/Development Plans, or equivalent plans demonstrating that all site disturbance is within the required dimensions.
- OR For the restoration option discussed in this credit, show the planting areas as well as a planting schedule on the Landscape Plan. Distinguish between existing landscaping and restored landscaping.

Requirement: ☐ Reduce the development footprint (including building, access roads and parking) to exceed the installation/base's master plan or local zoning's open space requirement for the site by 25% or in accordance with installation/base policy on open space set asides, whichever is greater. If no zoning or open space policies exist, designate open space equal to the development footprint. 1

Suggested Documentation: ☐ *Design Analysis*: Include a copy of the open space requirements from the Installation Master Plan or local zoning code. Provide calculations demonstrating that the requirement has been satisfied. When no zoning codes exist, demonstrate that an area equal to the development footprint (including building, access roads and parking) is designated as open space.

Technologies /Strategies: Perform a site survey to identify site elements and adopt a master plan for development of the project site. Select a suitable building location and design the building with a minimal footprint to minimize site disruption. Strategies include stacking the building program, tuck-under parking and sharing facilities with neighbors. Establish clearly marked construction boundaries to minimize disturbance of the existing site and restore previously degraded areas to their natural state. Note requirements on plans and in specifications.

Consider the implications of force protection requirements when developing the siting, orientation, and massing of the building. Consider site disturbance along with building orientation, the accesses to the building, and other major landscape features during conceptual development. The balance between open area on the site and the building requirements may affect both the shape and size of the building. The site layout process typically is the first stage of the building design process and may run in parallel with defining the building program and building massing or occur shortly after.

Establish contractual penalties for destruction of trees and site areas noted for protection. Delineate laydown, recycling, and disposal areas. Use areas to be paved or already paved as staging areas. Work with local horticultural extension services, native plant societies, or installation/base agronomy staff to select indigenous plant species for site restoration and landscaping.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (SS) (Continued)

1.C6 Stormwater Management ⁽¹⁾

Intent: Limit disruption of natural water flows by minimizing storm water runoff, increasing on-site infiltration, and reducing contaminants.

Requirement: ☐ If existing imperviousness is less than or equal to 50%, implement a stormwater management plan that prevents the post-development 1.5 year, 24 hour peak discharge rate from exceeding the pre-development 1.5 year, 24 hour peak discharge rate. OR If existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff. **1**

Suggested Documentation: ☐ *Specifications*: 02600 Drainage and Containment, and 02700 Pavements.
☐ *Drawings*: On the appropriate site plan, such as the Site Paving Plan or Landscape Plan, highlight paved area and site contours showing how water is retained on site. Provide a paving schedule indicating the type of paving used in each area and a reference to the perviousness of the material. Also highlight locations of retaining ponds or other systems intended to minimize stormwater runoff.
☐ *Design Analysis*:

- Provide cut sheets for pervious paving systems used to lower runoff.
- OR Provide a stormwater management plan as described in the credit for sites with existing imperviousness. Provide calculations showing that run off has been reduced by 50% from undeveloped to developed conditions.

Requirement: ☐ Construct site stormwater treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS) and 40% of the average annual post development total phosphorous (TP) based on the average annual loadings from all storms less than or equal to the 2-year/24-hour storm. Do so by implementing Best Management Practices (BMPs) outlined in Chapter 4, Part 2 (Urban Runoff), of the United States Environmental Protection Agency's (EPA's) *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, January 1993 (Document No. EPA-840-B-92-002) or the local government's BMP document (whichever is more stringent). **1**

Suggested Documentation: ☐ *Specifications*: 02300 Earthwork, and 11300 Fluid Waste Treatment and Disposal Equipment.
☐ *Drawings*: Show the location of passive systems on the appropriate site plan such as on the Site Grading Plan, Site Development Plan, or Landscape Plan. Include detail drawings for active systems such as mechanical filters.
☐ *Design Analysis*: Provide a design narrative and calculations describing how the designed treatment systems will meet the requirements of this credit.

Technologies /Strategies: Design the project site to maintain natural stormwater flows by promoting infiltration. Specify garden roofs and pervious paving to minimize impervious surfaces. Reuse stormwater volumes generated for non-potable uses such as landscape irrigation, toilet, and urinal flushing and custodial uses. Retain pervious and vegetated areas to capture rainwater from impervious areas of the building for groundwater recharge. Design mechanically-based or utilize biologically-based and innovative stormwater management features for pollutant load reduction such as constructed wetlands, stormwater filtering systems, bioswales, bio-retention basins, and vegetated filter strips to treat the site's stormwater. Use open vegetated swales to reduce drainage velocity and erosion, reduce system maintenance, increase vegetative variety and support wildlife habitat where space permits.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (SS) (Continued)

1.C7 Landscape and Exterior Design to Reduce Heat Islands ⁽²⁾

Intent: Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirement: ☐ Provide shade (within 5 years) AND/OR use light-colored/high-albedo materials (reflectance of at least 0.3) or open grid pavement for 30% of the site's non-roof impervious surfaces, including parking lots, walkways, plazas, etc., OR place a minimum of 50% of parking spaces underground or covered by structured parking; OR use open-grid pavement system (less than 50% impervious) for a minimum of 50% of the parking lot area. **1**

Suggested ☐ *Specifications:* 02700 Pavements, and 02900 Planting.

Documentation: ☐ *Drawings:*

- On the Landscaping plans, show location, type of vegetation used for shading, and information about the mature size of selected vegetation. Highlight the impervious area to be shaded, or otherwise demonstrate with calculations and diagrams that 30% will be shaded within 5 years.
- **OR** Indicate on the Site Paving Plan the area where light-colored/high-albedo materials will be used and demonstrate that it accounts for at least 30% of the impervious areas.
- **OR** Demonstrate that at least 50% of the total parking is under-ground by indicating the number of spaces located in the underground parking as well as the number of parking spaces above ground. When underground parking is provided, the first few sheets of the architectural plans are typically reserved for below-grade floors and parking information used to satisfy this credit should be shown on these sheets.
- **OR** Indicate on the Site Paving Plan the area where pervious paving systems will be used and demonstrate that it accounts for at least 50% of the parking lot areas. Also include a note on the Paving Plan drawings stating that the pervious paving system is to have an impervious area of LESS than 50%.

Requirement: ☐ Use ENERGY STAR Roof compliant, high-reflectance AND high emissivity roofing (emissivity of at least 0.9 when tested in accordance with ASTM E408) for a minimum of 75% of the roof surface; OR, install a "green" (vegetated) roof for at least 50% of the roof area. Combinations of high albedo and vegetated roof can be used providing they collectively cover 75A% of the total roof area. **1**

Suggested ☐ *Specifications:* 07300 Steep Roofing, 07400 Roofing and Siding Panels, and 07500 Membrane Roofing.

Documentation: ☐ *Drawings:*

- On the Roof Plan, show that a minimum of 75% of the roof area meets the requirements for reflectance and emissivity. Specify roofing type, reflectance, and emissivity on the Roof Plan as well as any area calculations.
- For Green roofs, show on the Roof Plan that the green roof covers at least 50% of the total roof area or that a combination of green roof and high-reflectance and high emissivity roofing account for 75% of the total roof area. Also reference detail drawings for the green roof. (Detail drawings are typically included toward the end of the Architectural pages of the Construction Documents.)

Technologies /Strategies: Shade constructed surfaces on the site with landscape features and minimize the overall building footprint. Consider replacing constructed surfaces (i.e. roof, roads, sidewalks, etc.) with vegetated surfaces such as garden roofs and open grid paving or specify high-albedo materials to reduce the heat absorption. Visit the ENERGY STAR® Web site, www.energystar.gov, to look for compliant products. Consider installing high-albedo and vegetated roofs to reduce heat absorption. Note albedo/ reflectance requirements in the drawings and specifications. Provide shade (calculated on June 21, noon solar time) using native or climate tolerant trees and large shrubs, vegetated trellises, or other exterior structures supporting vegetation. Explore elimination of blacktop and the use of new coatings and integral colorants for asphalt to achieve light colored surfaces.

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1.0 Sustainable Sites (SS) (Continued)

1.C8 Light Pollution Reduction ⁽¹⁾

Intent: Eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environments.

Requirement: ☐ Meet or provide lower light levels and uniformity ratios than those recommended by the Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual: Lighting for Exterior Environments (RP-33-99). Design exterior lighting such that all exterior luminaires with more than 1000 initial lamp lumens are shielded and all luminaires with more than 3500 initial lamp lumens are Full Cutoff (IESNA Classification). The maximum candela value of all interior lighting shall fall within the building (not out through windows) and the maximum candela value of all exterior lighting shall fall within the site. Any luminaire within a distance of 2.5 times its mounting height from the site boundary shall have shielding such that no light or brightness from that luminaire crosses the site boundary. 1

Suggested Documentation: ☐ *Specifications:* 16500 Lighting.
☐ *Drawings:* On electrical plans, highlight exterior lighting as needed to demonstrate compliance.
☐ *Design Analysis:* Include cut sheets and lighting calculations in the Design Analysis that demonstrate compliance. Diagrams drawn to scale may be helpful to demonstrate compliance with this requirement. If not clearly defined, the site boundary shall be considered to include all disturbed land with a 50 foot buffer.

Technologies /Strategies: Adopt site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution. Minimize site lighting where possible and model the site lighting using a computer model. Technologies to reduce light pollution include full cutoff luminaires, low-reflectance surfaces, and low-angle spotlights. Exterior lighting should be consistent with security lighting requirements.

1.C9 Optimize Site Features ⁽³⁾

Intent: Optimize utilization of the site's existing natural features and placement of man-made features on the site.

Requirement: ☐ Perform both of the following: 1

- Plan facility orientation and layout to maximize the use of free site energy and to take advantage existing site amenities such as trees and water features.
- Plan facility, parking, and roadways to "fit" existing site contours and limit cut and fill consistent with force protection measures.

Suggested Documentation: ☐ *Specifications:* 02230 Site Clearing, 02300 Earthwork, and 13600 Solar and Wind Energy Equipment.
☐ *Drawings:* On the Site Grading Plan show existing and proposed contours.
☐ *Design Analysis:*

- Include a narrative describing the prevailing winds and solar properties of the site that were taken into consideration in the design. Also describe systems incorporated into the building to take advantage of free site energy to meet the requirements.
- AND In the Design Analysis describe efforts taken to minimize cut and fill on the site in accordance with this credit. It may be helpful to reference the Site Grading Plan showing existing and proposed contours.

Technologies /Strategies: Evaluate site resources to ascertain how each can enhance the proposed project and visa versa. Work to maximum advantage of the site's solar and wind attributes. Use landscaping to optimize solar and wind conditions and to contribute to energy efficiency; Locate and orient the facility on the site to optimize solar and wind conditions.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (SS) (Continued)

1.C10 Facility Impact⁽³⁾

Intent: Minimize negative impacts on the site and on neighboring properties and structures; avoid or mitigate excessive noise, shading on green spaces, additional traffic, obscuring significant views, etc.

Requirement: ☐ Cluster facilities to reduce impact, access distance to utilities and sufficient occupant density to support mass transit. **1**

Suggested Documentation: ☐ *Design Analysis:*

- Include a narrative describing the measures taken to minimize impact on the site through employing the appropriate densities and taking advantage of adjacencies. Explain how the proposed design meets intent of the Installation Master Plan.
- Include diagrams for solar access and the resulting shadows for winter and summer seasons. Indicate the prevailing winds on a site plan diagram.

Requirement: ☐ Collaborate with installation/base and community planners to identify and mitigate potential impacts of the project beyond site boundaries, and transportation planners to insure efficient public transport. **1**

Suggested Documentation: ☐ *Design Analysis:* Include a narrative of measures taken to reduce excess noise, minimize blocking of significant views, and transportation planning measures. Refer to specific drawings when appropriate.

Technologies /Strategies: Involve local/regional planners and community members in installation/base master planning processes. Recognize the context and the impact of a project beyond site boundaries, and integrate it with the larger installation/base/community context/land use.

1.C11 Site Ecology⁽³⁾

Intent: Identify and mitigate all existing site problems including contamination of soil, water, and air, as well as any negative impacts caused by noise, eyesores, or lack of vegetation, enhancing or creating new site habitat.

Requirement: ☐ Develop site environmental management and mitigation plan. **1**

Suggested Documentation: ☐ *Design Analysis:* Include the Site Environmental Management and Mitigation Plan discussing how measures that are detrimental to the site environment/ecology will be avoided.

Technologies /Strategies: Understand site and surrounding ecosystem interdependence and interconnectivity. Plan landscaping scheme to incorporate biodiversity. Preserve/enhance existing trees, hydrological features, ecosystems, habitats, and cultural resources. Increase the existence of healthy habitat for native species. Reintroduce native plants and trees where they have been destroyed by previous development.

⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

2.0	Water Efficiency (WE)	Score	5
2.C1	<u>Water Efficient Landscaping</u> ⁽²⁾		
Intent:	Limit or eliminate the use of potable water for landscape irrigation.		
Requirement:	<input type="checkbox"/> Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.	1	
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 02810 Irrigation systems, 02900 Plantings, and 02600 Drainage and Containment <input type="checkbox"/> <i>Drawings</i> : Show and highlight the location of rainwater collection cistern on the Site plan. <input type="checkbox"/> <i>Design Analysis</i> : <ul style="list-style-type: none"> Include a narrative describing the irrigation system and the features that make it efficient. Provide baseline calculations and design calculations for the insulation system. Also include an explanation of native or adapted planting. OR Provide a narrative describing the gray water irrigation system. Provide baseline calculations and design calculations for the insulation system. Also include an explanation of native or adapted planting. 		
Requirement:	<input type="checkbox"/> Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems.	1	
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 02810 Irrigation systems, 02900 Plantings, and 02600 Drainage and Containment. <input type="checkbox"/> <i>Drawings</i> : <ul style="list-style-type: none"> Show and highlight the location of rainwater collection cistern on the Site plan. Note on Landscape plans "NO PERMANENT LANDSCAPE IRRIGATION SYSTEM TO BE INSTALLED" <input type="checkbox"/> <i>Design Analysis</i> : <ul style="list-style-type: none"> Include a narrative describing the gray water irrigation system. Provide baseline calculations and design calculations showing that the system is capable of providing 100% of the irrigation required for the site. OR Provide a narrative describing how the site will not require permanent irrigation. 		
Technologies /Strategies:	Perform a soil/climate analysis to determine appropriate landscape types and design the landscape with indigenous plants to reduce or eliminate irrigation requirements. Use high-efficiency irrigation systems and consider using stormwater and/or greywater for irrigation. Develop a landscaping water use baseline according to the methodology outlined in the LEED Reference Guide.		
2.C2	<u>Innovative Wastewater Technologies</u> ⁽²⁾		
Intent:	Reduce generation of wastewater and potable water demand, while increasing local aquifer recharge.		
Requirement:	<input type="checkbox"/> Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards.	1	
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 15400 Plumbing Fixtures and Equipment, 11300 Wastewater Biological Systems Equipment, 13220 Wastewater Filtration Equipment, and 13260 Wastewater Handling and Treatment Equipment. <input type="checkbox"/> <i>Drawings</i> : <ul style="list-style-type: none"> Highlight fixtures and schedules on the Plumbing Plans for systems used to reduce potable water use. OR Show organic or natural treatment systems on the Site Plan or on the Landscape Plan. Show location of mechanical treatments systems on the Floor Plan and submit shop drawings. Highlight high-efficiency plumbing fixtures on the Mechanical or Plumbing sheets. <input type="checkbox"/> <i>Design Analysis</i> : <ul style="list-style-type: none"> Describe measures taken to reduce potable water consumption. Provide design calculations and baseline calculations for municipally provided potable water. OR Provide design calculations for the on-site wastewater system. Describe how the system works and demonstrate that it is capable of treating all wastewater to the required levels. 		
Technologies /Strategies:	Specify high-efficiency fixtures and dry fixtures such as composting toilets and waterless urinals to reduce wastewater volumes. Consider reusing stormwater or greywater for sewage conveyance or on-site wastewater treatment systems (mechanical and/or natural). Develop a wastewater baseline according to the methodology outlined in the LEED Reference Guide. Implement decentralized on-site wastewater treatment and reuse systems. Provide advanced wastewater treatment after use by employing innovative, ecological, on-site technologies including constructed wetlands, a mechanical recirculating sand filter, or aerobic treatment systems.		

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2.0 Water Efficiency (WE) (Continued)

2.C3 Water Use Reduction ⁽²⁾

Intent: Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement: ☐ Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting the Energy Policy Act of 1992 fixture performance requirements. **1**

Suggested Documentation: ☐ *Specifications*: 15400 Plumbing Fixtures and Equipment, 15700 HVAC Equipment, and Division 11 Equipment.
☐ *Design Analysis*: Describe the strategies used to reduce the water consumption from the baseline by the required percentage for the given points. Provide design calculations and baseline calculations demonstrating that the requirement has been met.

Requirement: ☐ Employ strategies that in aggregate use 30% less water than the water use baseline calculated for the building (not including irrigation) after meeting the Energy Policy Act of 1992 fixture performance requirements. **1**

Suggested Documentation: ☐ *Specifications*: 15400 Plumbing Fixtures and Equipment, 15700 HVAC Equipment, and Division 11 Equipment.
☐ *Design Analysis*: Describe the strategies used to reduce the water consumption from the baseline by the required percentage for the given points. Provide design calculations and baseline calculations demonstrating that the requirement has been met.

Technologies /Strategies: Estimate the potable and non-potable water needs for the building. Use high efficiency fixtures, dry fixtures such as composting toilets and waterless urinals, and occupant sensors to reduce the potable water demand. Consider reuse of stormwater and greywater for non-potable applications such as toilet and urinal flushing, mechanical systems and custodial uses. Develop a water use baseline including all water consuming fixtures, equipment, and seasonal conditions according to methodology guidance outlined in the LEED Reference Guide. Specify high water efficiency equipment (dishwashers, laundry, cooling towers, etc.). Use recycled or storm water for HVAC/process make up water. Install cooling tower systems designed to minimize water consumption from drift, evaporation and blowdown.

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3.0	Energy and Atmosphere (EA)	Score	28
3.R1	Fundamental Building Systems Commissioning ⁽²⁾	Reqd.	
Intent:	Verify and ensure that fundamental building elements and systems are designed, installed, and calibrated to operate as intended.		
Requirement:	<input type="checkbox"/> Implement all of the following fundamental best practice commissioning procedures. <ul style="list-style-type: none">Engage a commissioning authority.Develop design intent and basis of design documentation.Include commissioning requirements in the construction documents.Develop and utilize a commissioning plan.Verify installation, functional performance, training and documentation.Complete a commissioning report.		
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 01800 Facility Operation, and 15950 Testing/Adjusting/Balancing. <input type="checkbox"/> <i>Design Analysis</i> : Provide a copy of the contract with the commissioning agent and a copy of the commissioning plan. Include a narrative that describes how the other aspects of this requirement have been satisfied.		
Technologies /Strategies:	Engage a commissioning authority and adopt a commissioning plan. Include commissioning requirements in bid documents and task the commissioning agent to produce a commissioning report once commissioning activities are completed. Introduce standards and strategies into the design process early, and then carry through selected measures by clearly stating target requirements in the construction documents. Tie contractor final payments to documented system performance. Consult Engineer Regulation 1110-345-723, Systems Commissioning Procedures for additional guidance.		
3.R2	Minimum Energy Performance ⁽¹⁾	Reqd.	
Intent:	Establish the minimum level of energy efficiency for the base building and systems.		
Requirement:	<input type="checkbox"/> Design the building to comply with the latest version of ASHRAE/IESNA Standard 90.1.		
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis</i> : <ul style="list-style-type: none">Provide a narrative or summary table of design features that comply with TI-800-01 which references UFC 3-400-01, Design: Energy Conservation.Provide a copy of the report from energy simulation software (BLAST, DOE-2, EnergyPlus) as per requirements of ASHRAE 90.1-2001.		
Technologies /Strategies:	Design the building envelope and systems to maximize energy performance. Use a computer simulation model to assess the energy performance and identify the most cost effective energy measures. Quantify energy performance compared to the baseline building. Use building modeling and analysis techniques to establish and document compliance. ASHRAE/IESNA 90.1-2001, Appendix G, provides guidance for establishing building base case development and analysis. Refer to the LEED Reference Guide for a wide variety of energy efficiency strategy resources.		
3.R3	CFC Reduction in HVAC&R Equipment ⁽²⁾	Reqd.	
Intent:	Reduce ozone depletion.		
Requirement:	<input type="checkbox"/> Zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.		
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 15600 Refrigeration Equipment, 15700 HVAC Equipment, and 01800 Facility Operation. <input type="checkbox"/> <i>Design Analysis</i> : Provide or include a review of the CFC phase-out/conversion in the commissioning plan demonstrating compliance as outlined.		
Technologies /Strategies:	When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC refrigerants and adopt a replacement schedule for these refrigerants. For new buildings, specify new HVAC equipment that uses no CFC refrigerants.		

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3.0 Energy and Atmosphere (EA) (Continued)

3.C1 Optimize Energy Performance ⁽¹⁾

Intent: Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Requirement: ☐ Reduce design energy cost compared to the energy cost budget for energy systems regulated by the latest version of ASHRAE/IESNA Standard 90.1, as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11 and Appendix G of the Standard. **20**

- 1 Point will be awarded for every reduction in design energy cost of 2.5% for both new and existing facilities for a maximum score of 20 points.

Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE.

Suggested Documentation: ☐ *Design Analysis:*

- Provide a narrative describe the energy saving measures incorporated in the building. Show a table of model variables that differ from the baseline case to the proposed design and give the values used in the energy simulation.
- Provide a copy of the report from energy simulation software (BLAST, DOE-2, EnergyPlus) showing the percentage that the Design Energy Use (DEU) is less than the Design Energy Budget (EUB) as defined in ASHRAE 90.1-2001. Unit of measure for performance shall be annual energy cost. Life-Cycle energy costs shall be determined using rates for purchased energy, such as electricity, gas, oil, propane, steam, and chilled water and approved by the adopting authority. Life Cycle Costing is to be done in accordance with 10 CFR 436.

Technologies /Strategies: Design the building envelope and building systems to maximize energy performance. Use a computer simulation model to assess the energy performance and identify the most cost-effective energy efficiency measures. Quantify energy performance as compared to a baseline building.

Perform interactive energy use analysis for selected design elements that affect energy performance and document compliance. Life-Cycle energy costs shall be determined using rates for purchased energy, such as electricity, gas, oil, propane, steam, and chilled water and approved by the adopting authority. Refer to the LEED Reference Guide or Whole Building Design Guide for a wide variety of energy efficiency resources and strategies including conservation measures, electromechanical energy efficiency technologies (for example ground-source heat pumps), passive heating and cooling strategies, solar hot water, and daylighting.

Life-Cycle costing will be done in accordance with 10 CFR 436.

Consider installation of an Energy Management and Control System (EMCS), which is compatible with exiting installation systems to optimize performance. Use sensors to control loads based on occupancy, schedule and/or the availability of natural resources use (day light or natural ventilation).

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

3.0 Energy and Atmosphere (EA) (Continued)

3.C2 Renewable Energy ⁽¹⁾

Intent: Encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use.

Requirement: ☐ Supply a net fraction of the building's total energy use through the use of on-site renewable energy systems.

% of Total Annual Energy Usage in Renewables

5%	1
10%	2
15%	3
20%	4

Suggested Documentation: ☐ *Specifications*: 01800 Facility Operation, 13600 Solar and Wind Energy Equipment, and 16200 Electrical Power.
☐ *Drawings*: Highlight the location of renewable energy systems on the Site Plan and on the architectural plans where appropriate.
☐ *Design Analysis*: Provide calculations showing the percentage of building energy provided by on-site renewable energy systems. Include a narrative describing energy saving measures incorporated in the building. Include a section in the Commissioning Plan to insure that the percentage of power provided by renewable systems is maintained throughout the facility life cycle.

Technologies /Strategies: Assess the project for non-polluting and renewable energy potential including solar, wind, geothermal, low-impact hydro, biomass, and bio-gas strategies. When applying these strategies, take advantage of net metering with the local utility.

Employ the use of on-site non-polluting-source renewable technologies contributing to the total energy requirements of the project. Passive solar, solar hot water heating, ground-source heat pumps, and daylighting do not qualify for points under this credit. Credit for these strategies is given in Energy & Atmosphere Credit 1: Optimizing Energy Performance.

3.C3 Additional Commissioning ⁽²⁾

Intent: Verify and ensure that the entire building is designed, constructed, and calibrated to operate as intended.

Requirement: ☐ In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks: 1

1. Conduct a focused review of the design prior to the construction documents phase.
2. Conduct a focused review of the construction documents when close to completion.
3. Conduct a selective review of contractor submittals of commissioned equipment.
4. Develop a system and energy management manual.
5. Have a contract in place for a near-warranty end or post occupancy review.

Items 1, 2, and 3 must be performed by someone other than the designer.

Suggested Documentation: ☐ *Specifications*: 01800 Facility Operation, and 15950 Testing/Adjusting/Balancing.
☐ *Design Analysis*: Include a copy of the contract for additional commissioning in the Design Analysis.

Technologies /Strategies: Engage the commissioning authority early in the design phases.

3.C4 << Deleted >> ⁽¹⁾

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⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

3.0 Energy and Atmosphere (EA) (Continued)

3.C5 Measurement and Verification ⁽²⁾

Intent: Provide for the ongoing accountability and optimization of building energy and water consumption performance over time.

- Requirement: ☐ Install continuous metering equipment for the following end-uses: 1
- Lighting systems and controls.
 - Constant and variable motor loads.
 - Variable frequency drive (VFD) operation.
 - Chiller efficiency at variable loads (kW/ton).
 - Cooling load.
 - Air and water economizer and heat recovery cycles.
 - Air distribution static pressures and ventilation air volumes.
 - Boiler efficiencies.
 - Building specific process energy efficiency systems and equipment.
 - Indoor water risers and outdoor irrigation systems.

Develop a Measurement and Verification plan that incorporates the monitoring information from the above end-uses and is consistent with Option B, C or D of the 2001 *International Performance Measurement & Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy and Water Savings*.

- Suggested Documentation: ☐ *Specifications*: 16290 Power Measure & Control, and 15900 HVAC Instrumentation and Control.
- ☐ *Drawings*: Highlight the equipments installed in the building for purposes of monitoring on the Mechanical Plan, and Electrical Plan.
- ☐ *Design Analysis*: Include a list of all measurement devices installed in the building. Also provide a copy of the measurement and verification plan with a summary schedule of instruments and controls related to each monitoring category.

Technologies /Strategies: Model the energy and water systems to predict savings. Design the building with equipment to measure energy and water performance. Draft a Measurement & Verification Plan to apply during building operation that compares predicted savings to those actually achieved in the field. Employ building automation systems to perform M&V functions where applicable. Tie contractor final payments to documented M&V system performance and include in the commissioning report. Provide for ongoing M&V system maintenance and operating plan in building operations and maintenance manuals. Consider installation of an Energy Management and Control System (EMCS), which is compatible with exiting installation/base systems to optimize performance.

3.C6 Green Power ⁽²⁾

Intent: Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

- Requirement: ☐ Provide at least 50% of the building's electricity from renewable sources by engaging in at least a two-year renewable energy contract. Renewable sources are as defined by the Center for Resource Solutions (CRS) Green-e products certification requirements. 1

- Suggested Documentation: ☐ *Design Analysis*: Provide calculations for the expected building power consumption. Include a copy of a minimum 2-year contract to purchase power equal to the projected building consumption

Technologies /Strategies: Determine the energy needs of the building and investigate opportunities to engage in a green power contract with the local utility. Green power is derived from solar, wind, geothermal, biomass or low-impact hydro sources. Green power may be procured from a Green-e certified power marketer, a Green-e accredited utility program, through Green-e certified Tradable Renewable Certificates, or from a supply that meets the Green-e renewable power definition. Visit www.green-e.org for details about the Green-e program.

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3.0 Energy and Atmosphere (EA) (Continued)

3.C7 Distributed Generation ⁽³⁾

Intent:	Encourage the development and use of distributed generation technologies, which are less polluting than grid-source energy.		
Requirement:	<input type="checkbox"/> Reduce total energy usage and emissions by considering source energy implications and local cogeneration and direct energy conversion. Generate at least 50% of the building's projected annual consumption by on-site distributed generation sources.		1
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 01800 Facility Operation, 13600 Solar and Wind Energy Equipment, and 16200 Electrical Power <input type="checkbox"/> <i>Drawings</i> : Highlight the location of generation equipment/facilities on the Site Plan. <input type="checkbox"/> <i>Design Analysis</i> : Provide narrative including calculations demonstrating that the on-site energy generation system is capable of supplying 50% of the building energy requirements. Include a section in the Commissioning Plan to insure that the percentage of power provided by renewable systems is maintained throughout the facility life cycle.		
Technologies /Strategies:	Investigate the use of integrated generation and delivery systems, such as co-generation, fuel cells, micro-turbines and off-peak thermal storage.		

⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

4.0	Materials and Resources (MR)	Score	13
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4.R1 Storage & Collection of Recyclables ⁽²⁾**Reqd.**

Intent: Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirement: ☐ Provide an easily accessible area that serves the entire building that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.

Suggested Documentation: ☐ *Specifications*: 11170 Solid Waste Handling Equipment.
☐ *Drawings*: Highlight the area for collection of recyclables on the floor plans. Also highlight locations of waste collection chutes and receptacle areas.
☐ *Design Analysis*: Provide a narrative substantiating that the space allotted for collection of recyclables is adequate for the facility.

Technologies /Strategies: Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area. Identify local waste handlers and buyers for glass, plastic, office paper, newspaper, cardboard and organic wastes. Instruct occupants on building recycling procedures. Consider employing cardboard balers, aluminum can crushers, recycling chutes and other waste management technologies to further enhance the recycling program.

Establish a waste management plan which meets requirements of the installation/base environmental and/or solid waste management plans in cooperation with users to encourage recycling. Reserve space for recycling functions early in the building occupancy programming process and show areas dedicated to collection of recycled materials on space utilization plans. Broader recycling support space considerations should allow for collection and storage of the required elements and newspaper, organic waste (food and soiled paper), and dry waste. When collection bins are used, bin(s) should be able to accommodate a 75% diversion rate and be easily accessible to custodial staff and recycling collection workers. Consider bin designs that allow for easy cleaning to avoid health issues.

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4.0 Materials and Resources (MR) (Continued)

4.C1 **Building Reuse** ⁽²⁾

Intent: Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirement: Reuse large portions of existing structures during renovation or redevelopment projects.

- ☐ Maintain at least 75% of existing building structure and shell (exterior skin and framing, excluding window assemblies and non-structural roofing material). **1**

Suggested Documentation:

- ☐ *Specifications:* 02225 Selective Demolition.
- ☐ *Drawings:* Note and highlight on the Demolition Plans the structural elements which are to be preserved. On the Elevations, note and highlight the shell elements to be preserved.
- ☐ *Design Analysis:* Provide calculations substantiating that at least 75% of the existing building structure and shell are being preserved.

Requirement: ☐ Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing, excluding window assemblies and non-structural roofing material). **1**

Suggested Documentation:

- ☐ *Specifications:* 02225 Selective Demolition
- ☐ *Drawings:* Note and highlight on the Demolition Plans the structural elements which are to be preserved. On the Elevations, note and highlight the shell elements to be preserved.
- ☐ *Design Analysis:* Provide calculations substantiating that 100% of the existing building structure and shell are being preserved.

Requirement: ☐ Maintain 100% of existing building structure and shell (exterior skin and framing, excluding window assemblies and non-structural roofing material) AND at least 50% of non-shell areas (interior walls, doors, floor coverings and ceiling systems). **1**

Suggested Documentation:

- ☐ *Specifications:* 02225 Selective Demolition.
- ☐ *Drawings:* Note and highlight on the Demolition Plans the structural and non-structural elements which are to be preserved. On the Elevations, note and highlight the shell elements to be preserved.
- ☐ *Design Analysis:* Provide calculations substantiating that 100% of the existing building structure and shell are being preserved AND 50% of the non-shell components.

Technologies /Strategies: Consider reuse of existing buildings, including structure, shell, and non-shell elements. Remove elements that pose contamination risk to building occupants and upgrade outdated components such as windows, mechanical systems, and plumbing fixtures. Quantify the extent of building reuse. Evaluate retention of existing structure. Consider facade preservation, particularly in installation/base areas. During programming and space planning, consider adjusting needs and occupant use patterns to fit within existing building structure and interior partition configurations. Identify and effectively address energy, structural, and indoor environmental (lead & asbestos) issues in building reuse planning and deconstruction documents. Percentage of reused non-shell building portions will be calculated as the total area (in Square Feet (SF)) of reused walls, floor covering, and ceiling systems, divided by the existing total area (SF) of walls, floor covering, and ceiling systems.

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4.0 Materials and Resources (MR) (Continued)

4.C2 Construction Waste Management ⁽²⁾

Intent: Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process. Redirect reusable materials to appropriate sites.

Requirement: Develop and implement a waste management plan, quantifying material diversion goals:

- ☐ Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste. Calculations can be done by weight or volume, but must be consistent throughout. **1**

Suggested Documentation: ☐ *Specifications*: 01505 Construction Waste Management.
☐ *Design Analysis*: Include a Construction Waste Management Plan.

Requirement: ☐ Recycle and/or salvage an additional 25% (75% total) of the construction, demolition, and land clearing waste. Calculations can be done by weight or volume, but must be consistent throughout. **1**

Suggested Documentation: ☐ *Specifications*: 01505 Construction Waste Management.
☐ *Design Analysis*: Include a Construction Waste Management Plan.

Technologies /Strategies: Establish goals for landfill diversion and adopt a construction waste management plan which meets requirements of the installation/base environmental and/or solid waste management plans to achieve these goals. Consider recycling land clearing debris, cardboard, metal, brick, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation. Designate a specific area on the construction site for recycling and track recycling efforts throughout the construction process. Identify construction haulers and recyclers to handle the designated materials. Note that salvage may include donation of materials to charitable organizations such as Habitat for Humanity.

Consider deconstruction, salvage, and recycling strategies and processes, including waste auditing; and documenting the cost for recycling, salvaging, and reusing materials. Source reduction on the job site should be an integral part of the plan.

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4.0 Materials and Resources (MR) (Continued)

4.C3 Resource Reuse ⁽²⁾

Intent:	Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources.	
Requirement:	<input type="checkbox"/> Use salvaged, refurbished, or reused materials, products and furnishings for at least 5% of building materials.	1
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : XX050 for each material division <input type="checkbox"/> <i>Design Analysis</i> : Provide a table listing all sections of the specifications where salvaged or refurbished material have been specified including the respective estimated dollar values of these materials. Demonstrate that this accounts for 5% of the building materials used.	
Requirement:	<input type="checkbox"/> Use salvaged, refurbished, or reused materials, products and furnishings for at least 10% of building materials.	1
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : XX050 for each material division. <input type="checkbox"/> <i>Design Analysis</i> : Provide a table listing all sections of the specifications where salvaged or refurbished material have been specified including the respective estimated dollar values of these materials. Demonstrate that this accounts for 10% of the building materials used.	
Technologies /Strategies:	Identify opportunities to incorporate salvaged materials into building design and research potential material suppliers. Consider salvaged materials such as beams and posts, flooring, paneling, doors and frames, cabinetry and furniture, brick and decorative items. See the LEED Reference Guide for calculation tools and guidelines.	
	Determine percentages in terms of dollar value using the following steps: <ol style="list-style-type: none"> 1. Calculate total dollars* (see exclusions) of the salvaged or refurbished material. 2. Calculate total dollars (see exclusions) of all building materials. 3. Divide Step 1 by Step 2 to determine the percentage. 	
	Exclusions: In total dollar calculations, exclude; labor costs; all mechanical and electrical material and labor costs and project overhead and fees. *If the cost of the salvaged or refurbished material is below market value, use replacement cost to estimate the material value, otherwise use actual cost to the project.	

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4.0 Materials and Resources (MR) (Continued)

4.C4 Recycled Content ⁽²⁾

Intent: Increase demand for building products that incorporate recycled content materials, therefore reducing impacts resulting from extraction and processing of new virgin materials.

Requirement: ☐ Use materials with recycled content so that the sum of the post-consumer recycled content plus one-half of the post-industrial recycled content constitutes at least 5% of the total value of materials in the project. **1**

Requirement: ☐ Use materials with recycled content so that the sum of the post-consumer recycled content plus one-half of the post-industrial recycled content constitutes at least 10% of the total value of materials in the project. **1**

The value of the recycled content portion of a material or furnishing shall be determined by dividing the weight of recycled content in the item by the total weight of all material in the item, then multiplying the resulting percentage by the total value of the item.

Mechanical and electrical components shall not be included in this calculation. Recycled content materials shall be defined in accordance with the Federal Trade Commission document, *Guides for the Use of Environmental Marketing Claims*, 16 CFR 260.7 (e), available at www.ftc.gov/bcp/gmrule/guides980427.htm.

Suggested Documentation: ☐ *Specifications*: XX050 for each material division.
☐ *Design Analysis*: Provide a table listing all sections of the specifications where recycled materials or materials with recycled content are available. List the percentage of recycled content per material, the estimated quantity, the cost, and the total estimated project cost. Provide calculations showing the total recycled content as a percentage.

Technologies /Strategies: Establish a project goal for recycled content materials and identify material suppliers that can achieve this goal. During construction, ensure that the specified recycled content materials are installed and quantify the total percentage of recycled content materials installed.

Select products and materials with supporting information from the AIA Resource Guide or the EPA Environmentally Preferable Purchasing (EPP) Program. Common building materials and products with recycled content include; wall, partition, and ceiling materials and systems; insulation; tiles and carpets; cement, concrete, and reinforcing metals; structural and framing steel. For products/materials not listed, selection should be made on the basis of EPP criterion and/or:

- Toxicity;
- Embodied energy;
- Production use of water, energy and ozone depleting substances (ODSs);
- Production limits on toxic emissions and effluents;
- Minimal, reusable or recycled/recyclable packaging;
- Impact on indoor environmental quality (IEQ);
- Installation that limits generation of waste;
- Materials that limit waste generation over their life;
- EPA guideline compliance; and
- Harvested on a sustainable yield basis.

See the LEED Reference Guide for a summary of the EPA guidelines and calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars (see exclusions) of the material that contain recycled content.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees)

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4.0 Materials and Resources (MR) (Continued)

4.C5 Local/Regional Materials ⁽²⁾

Intent: Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation.

Requirement: ☐ Use a minimum of 20% of building materials and products that are manufactured* regionally within a radius of 500 miles. **1**

* Manufacturing refers to the final assembly of components into the building product that is furnished and installed by the tradesmen. For example, if the hardware comes from Dallas, Texas, the lumber from Vancouver, British Columbia, and the joist is assembled in Kent, Washington; then the location of the final assembly is Kent, Washington.

Suggested Documentation: ☐ *Specifications*: XX050 for each division.
☐ *Design Analysis*: Provide a table listing all sections of the specifications for which regionally manufactured materials are available within a 500 mile radius. List the estimated quantity, unit cost, and the total estimated project cost. Demonstrate that 20% of the building materials were manufactured within a 500 mile radius.

Requirement: ☐ Of the regionally manufactured materials documented for MR Credit 4.C5.1, above, use a minimum of 50% of building materials and products that are extracted, harvested or recovered (as well as manufactured) within 500 miles of the project site. **1**

Suggested Documentation: ☐ *Specifications*: XX050 for each material division.
☐ *Design Analysis*: Provide an expansion of the table above, showing which materials were harvested, extracted, or recovered (as well as manufactured) within a 500 mile radius. Demonstrate that 50% of the building materials are so defined.

Technologies /Strategies: Establish a project goal for locally sourced materials and identify materials and materials suppliers that can achieve this goal. During construction, ensure that the specified local materials are installed and quantify the total percentage of local materials installed.

Contact the state and local waste management boards for information about regional building materials. See the LEED Reference Guide for calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars (see exclusions) of material that is locally or regionally manufactured.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees.

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4.0 Materials and Resources (MR) (Continued)

4.C6 **Rapidly Renewable Materials** ⁽²⁾

- Intent: Reduce the use and depletion of finite raw and long cycle renewable materials by replacing them with rapidly renewable materials.
- Requirement: ☐ Use rapidly renewable building materials and products (made from plants that are typically harvested within a ten-year cycle or shorter) for 5% of the total value of all building materials and products used in the project. **1**
- Suggested Documentation: ☐ *Specifications*: XX050 for each division, and 09600 Flooring.
☐ *Drawings*: Note on appropriate architectural finish drawings where rapidly renewable materials are required.
☐ *Design Analysis*:
 - Provide a table listing sections of the specifications that call for rapidly renewable materials.
 - Show calculations that demonstrate that rapidly renewable materials account for 5% of total building materials. Determine percentages in terms of dollar value using the following steps:
 1. Calculate total dollars (see exclusions) of materials that are considered to be rapidly renewable.
 2. Calculate total dollars (see exclusions) of all building materials.
 3. Divide Step 1 by Step 2 to determine the percentage.
- Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees.
- Technologies /Strategies: Establish a project goal for rapidly renewable materials and identify materials and suppliers that can achieve this goal. Consider materials such as bamboo flooring, wool carpets, straw board, cotton batt insulation, linoleum flooring, poplar OSB, sunflower seed board, wheatgrass cabinetry and others. During construction, ensure that the specified rapidly renewable materials are installed. See the LEED Reference Guide for additional calculation methodology guidelines.

4.C7 **Certified Wood** ⁽²⁾

- Intent: Encourage environmentally responsible forest management.
- Requirement: ☐ Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council's Principals and Criteria, for wood building components including, but not limited to, structural framing and general dimensional framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers. **1**
- Suggested Documentation: ☐ *Specifications*: 06100 Rough Carpentry, 06200 Finish Carpentry, and 06400 Architectural Woodwork.
☐ *Drawings*: Note on applicable architectural and structural drawings where certified wood is to be used.
☐ *Design Analysis*: Provide a list of all wood-based products used and their costs. Highlight those that are certified wood and demonstrate that certified wood accounts for 50% of the costs for all wood-based products used for the project. Supply copies of chain of custody certification documentation from the supplier.
- Technologies /Strategies: Establish a project goal for FSC-certified wood products and identify suppliers that can achieve this goal. During construction, ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed.

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5.0	Indoor Environmental Quality (IEQ)	Score	17
5.R1	<u>Minimum IAQ Performance</u> ⁽¹⁾		Reqd.
Intent:	Establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, thus contributing to the comfort and well-being of the occupants.		
Requirement:	<input type="checkbox"/> Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda (see ASHRAE 62-2001, Appendix H, for a complete compilation of Addenda) using the Ventilation Rate Procedure.		
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 01800 Facility Operation, and 15950 Testing/Adjusting/Balancing. <input type="checkbox"/> <i>Drawings</i> : Include a note on the first sheet of the mechanical drawings stating compliance with ASHRAE 62-1999. Also state design criteria and assumptions. <input type="checkbox"/> <i>Design Analysis</i> : Include a letter from the Mechanical Engineer stating that the design complies with ASHRAE 62-1999. The letter should describe the design criteria and any assumptions made.		
Technologies /Strategies:	<p>Design the HVAC system to meet the ventilation requirements of the referenced standard. Identify potential IAQ problems on the site and locate air intakes away from contaminant sources.</p> <p>Include proactive design details that will eliminate some of the common causes of indoor air quality problems in buildings. Incorporate references to targets in plans and specifications. Ensure ventilation system outdoor air capacity can meet standards in all modes of operation. Locate building outdoor air intakes (including operable windows) away from potential pollutants/contaminant sources such as sporulating plants (allergens), loading areas, building exhaust fans, cooling towers, sanitary vents, dumpsters, vehicular exhaust, and other sources of contamination. Include operational testing in the building commissioning report. Design cooling coil drain pans to ensure complete draining. Include measures to control and mitigate radon buildup in areas where it is prevalent. Limit humidity to a range that minimizes mold growth and promotes respiratory health.</p>		
5.R2	<u>Environmental Tobacco Smoke (ETS) Control</u> ⁽²⁾		Reqd.
Intent:	Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).		
Requirement:	<input type="checkbox"/> Zero exposure of nonsmokers to ETS by EITHER: <ul style="list-style-type: none"> ▪ Prohibition of smoking in the building, OR <ul style="list-style-type: none"> ▪ Providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge). <p>Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.</p>		
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 01800 Facility Operation, and 15950 Testing/Adjusting/Balancing. <input type="checkbox"/> <i>Drawings</i> : Indicate designated outdoor smoking areas on the Site Plan (if applicable).		
Technologies /Strategies:	Prohibit smoking in the building or provide separate smoking rooms with isolated ventilation systems.		

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C1 IAQ Monitoring ⁽¹⁾

Intent: Provide capacity for indoor air quality (IAQ) monitoring to help sustain long-term occupant comfort and well-being.

Requirement: ☐ Install a permanent carbon dioxide (CO₂) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments. Refer to the CO₂ differential for all types of occupancy in accordance with ASHRAE 62-2001, Appendix D. **1**

Suggested Documentation: ☐ *Specifications*:

- 01800 Facility Operation, 13850 Detection and Alarm, and 15950 Testing/Adjusting/Balancing.
- Specifically note that indoor CO₂ levels should never be permitted to exceed outdoor levels by more than 530 parts per million

☐ *Drawings*: Highlight the location of CO₂ monitoring equipment in the Mechanical Drawings. Also state the set-point parameters.

Technologies /Strategies: Design the HVAC system with carbon dioxide monitoring sensors and integrate these sensors with the building automation system (BAS). Situate monitoring locations in areas of the building with high occupant densities and at the ends of the longest runs of the distribution ductwork. Specify that system operation manuals require calibration of all of the sensors per manufacturer recommendations but not less than one year. Include sensor and system operational testing and initial set point adjustment in the commissioning plan and report. Also consider periodic monitoring of carbon monoxide (CO), total volatile organic compounds (TVOCs), and particulates (including PM₁₀).

5.C2 Increase Ventilation Effectiveness ⁽²⁾

Intent: Provide for the effective delivery and mixing of fresh air to support the safety, comfort, and well-being of building occupants.

Requirement: ☐ For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (Eac) greater than or equal to 0.9 as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy. **1**

Suggested Documentation: ☐ *Design Analysis*: Provide plan and elevation drawings including furniture for each major room type. Graphically show how the airflow patterns are designed to meet the requirements of this credit. Also include a specification table of all the terminal vents, grills and registers cross-referenced in the drawings.

Technologies /Strategies: Design the HVAC system and building envelope to optimize air change effectiveness. Air change effectiveness can be optimized using a variety of ventilation strategies including displacement ventilation, low-velocity ventilation, plug-flow ventilation such as under floor or near floor delivery, and operable windows. Test the air change effectiveness of the building after construction. See the LEED Reference Guide for compliance methodology guidelines.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

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5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C3 Construction IAQ Management Plan⁽²⁾

Intent: Prevent indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

Requirement: ☐ Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows: **1**

- During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, chapter 3.
- Protect stored on-site or installed absorptive materials from moisture damage.
- If air handlers must be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill, as determined by ASHRAE 52.2-1999.
- Replace all filtration media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999 for media installed at the end of construction.

Suggested Documentation: ☐ *Design Analysis:*

- Provide a copy of the Construction IAQ Management Plan to be implemented during construction and pre-occupancy. Highlight areas that demonstrate how the SMACNA guidelines have been met or exceeded. Describe in a narrative the techniques used to protect absorptive materials from moisture damage.
- When air handlers are used during construction, include cutsheets for filtration media showing it meets the MERV of 8. Establish a payment clause in the contract with the contractor to insure filters are replaced with MERV 13 filters prior to occupancy.

Requirement: ☐ After construction ends and prior to occupancy conduct a minimum two-week building flush-out with new Minimum Efficiency Reporting Value (MERV) 13 filtration media at 100% outside air. After the flushout, replace the filtration media with new MERV 13 filtration media, except the filters solely processing outside air. OR Conduct a baseline indoor air quality testing procedure consistent with current EPA's current *Protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445*. **1**

Suggested Documentation: ☐ *Design Analysis:* Provide a letter from the architect or engineer detailing the building flush-out process, or provide a letter specifying how, when, and by whom an indoor air quality test will be performed. Supplement the Design Analysis with a copy of the testing results.

Technologies /Strategies: Adopt an IAQ management plan to protect the HVAC system during construction, control pollutant sources, and interrupt contamination pathways. Sequence the installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile, and gypsum wall board. Prior to occupancy, perform a two-week building flush-out or test the contaminant levels in the building.

Specify containment control strategies including protecting the HVAC system, controlling pollutant sources, interrupting pathways for contamination, enforcing proper housekeeping and coordinating schedules to minimize disruption. Specify the construction sequencing to install absorptive materials after the prescribed dry or cure time of wet finishes to minimize adverse impacts on indoor air quality. Materials directly exposed to moisture through precipitation, plumbing leaks, or condensation from the HVAC system are susceptible to microbial contamination. Appoint an IEQ Manager with owner's authority to inspect IEQ problems and require mitigation as necessary.

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5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C4 Low-Emitting Materials ⁽²⁾

Intent: Reduce the quantity of indoor air contaminants that are odorous, potentially irritating, and/or harmful to the comfort and well-being of installers and occupants.

Requirement: The VOC content of adhesives, sealants, paints, composite wood products, and carpet systems must be less than the current VOC limits as follows:

- ☐ The VOC content of adhesives and sealants used must be less than the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule #1168, AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51. 1
- ☐ VOC emissions from interior paints and coatings must not exceed the VOC and chemical component limits of Green Seal's Standard GS-11 requirements. 1
- ☐ Carpet systems must meet or exceed the requirements of the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. 1
- ☐ Composite wood or agrifiber products must contain no added urea-formaldehyde resins. 1

Suggested Documentation: ☐ *Specifications*: Ensure that VOC limits are clearly stated in specifications: 05950 Paints & Protective Coatings, 06100 Rough Carpentry, 06600 Plastic Fabrications, 07900 Joint Sealers, 09600 Flooring, 09700 Wall Finishes, and 09900 Paints & Coatings.

Technologies /Strategies: Specify Low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section where adhesives and sealants are addressed. Specify Low-VOC paints and coatings in construction documents. Ensure that VOC limits are clearly stated in each section where paints are addressed. Specify Low-VOC carpet products and systems in construction documents. Ensure that VOC limits are clearly stated where carpet systems are addressed. Specify wood and agrifiber products that contain no added urea-formaldehyde resins.

5.C5 Indoor Chemical and Pollutant Source Control ⁽¹⁾

Intent: Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Requirement: ☐ Design to minimize cross-contamination of regularly occupied areas by chemical pollutants: 1

- Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways.
- Where chemical use occurs (including housekeeping areas and copying/print rooms) provide segregated areas with structural deck to deck partitions with separate outside exhaust at a rate of 0.50 cubic feet per minute per square foot, no air recirculation and maintaining a negative pressure of at least 7 PA (0.03 inches of water gauge).
- Provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

Suggested Documentation: ☐ *Specifications*: 08400 Entrances, 12400 Furnishings and Accessories, and 15100 Building Services Piping.
☐ *Drawings*: Note permanent entryway systems such as grills, grates, etc., at all exterior entrances on the First Floor Plan or other plan sheets with building entrances from outdoors. Cross-reference and highlight positive pressure systems for entryways with the Mechanical Plans. Also highlight the exhaust air systems used in chemical use areas (housekeeping and copy/print rooms). Highlight drainage systems for rooms where chemical and water mixing may occur in the Plumbing Plans and Plumbing Schematics.

Technologies /Strategies: Design separate exhaust and plumbing systems for rooms with contaminants to achieve physical isolation from the rest of the building. Install permanent architectural entryway systems such as grills or grates to prevent occupant borne contaminants from entering the building.

Consider utilization of EPA registered anti-microbial treatments in carpet, textile or vinyl wall coverings, ceiling tiles or paints where microbial contamination is a concern. Utilize "breathable" wall finishes where circumstances require, to reduce moisture build-up and prevent microbial contamination. Minimize selection of fibrous materials, e.g. insulation, carpet and padding and flexible fabrics, whose exposed surfaces when exposed to the air stream or occupied space can contribute significant emissions and absorb and re-emit other contaminants over time.

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⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C6 Controllability of Systems ⁽²⁾

Intent:	Provide a high level of thermal, ventilation and lighting system control by individual occupants or specific groups in multi-occupant spaces (i.e. classrooms or conference areas) to promote the productivity, comfort and wellbeing of building occupants.		
Requirement:	<input type="checkbox"/>	Provide at least an average of one operable window and one lighting control zone per 200 square feet for all regularly occupied areas within 15 feet of the perimeter wall.	1
Suggested Documentation:	<input type="checkbox"/>	<i>Specifications</i> : 08500 Windows, and 15900 HVAC Instrumentation and Controls.	
	<input type="checkbox"/>	<i>Drawings</i> : Provide a window schedule highlighting the operable windows for rooms with floor area within 15 feet of the perimeter. Highlight the location lighting controls on the Electrical Plan.	
	<input type="checkbox"/>	<i>Design Analysis</i> : Provide a floor plan diagram showing a line indicating 15 feet from building perimeter. Demonstrate with calculations that each room within 15 feet of the perimeter has at least one operable window and one lighting control zone for every 200 square feet of floor area that is regularly occupied.	
Requirement:	<input type="checkbox"/>	Provide controls for each individual for airflow, temperature, and lighting for at least 50% of the occupants in non perimeter, regularly occupied areas.	1
Suggested Documentation:	<input type="checkbox"/>	<i>Specifications</i> : 08500 Windows, and 15900 HVAC Instrumentation and Controls.	
	<input type="checkbox"/>	<i>Drawings</i> : Indicate lighting controls on the Electrical Plan. Highlight temperature and airflow controls on the Mechanical Plan, or Air Distribution Plan. Indicate the expected occupancy of each non-perimeter room on the Floor Plan.	
	<input type="checkbox"/>	<i>Design Analysis</i> : Provide a floor plan diagram showing a line indicating 15 feet from building perimeter. Demonstrate with a table or other calculations that lighting and airflow controls have been provided for each occupant for all regularly occupied rooms not within 15 feet of the building perimeter.	
Technologies /Strategies:	Design the building with occupant controls for airflow, temperature, and lighting. Strategies to consider include lighting controls, task lighting and operable windows.		

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5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C7 Thermal Comfort ⁽²⁾

Intent:	Provide for a thermally comfortable environment that supports the productivity and well-being of building occupants.		
Requirement:	<input type="checkbox"/> Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. For naturally ventilated buildings, utilize the adaptive comfort temperature boundaries, using the 90% acceptability limits as defined in the California High Performance Schools (CHPS) Best Practices Manual, Appendix C – A Field Based Thermal Comfort Standard for Naturally Ventilated Buildings, Figure 2.		1
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 13400 Measurement and Control Instrumentation, 13500 Recording Instrumentation, and 13800 Building Automation and Control. <input type="checkbox"/> <i>Design Analysis</i> : Provide a letter from the mechanical engineer stating that the system design is done in accordance with ASHRAE standard 55-1992 Addenda 1995. For naturally ventilated systems, provide a letter from the mechanical engineer stating that the project complies with the 90% acceptability limits of the adaptive comfort temperature boundaries in the California High Performance Schools (CHPS) Best Practices Manual Appendix C – A Field Based Thermal Comfort Standard for Naturally Ventilated Buildings, Figure 2.		
Requirement:	<input type="checkbox"/> Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building.		1
Suggested Documentation:	<input type="checkbox"/> <i>Specifications</i> : 13400 Measurement and Control Instrumentation, 13500 Recording Instrumentation, and 13800 Building Automation and Control. <input type="checkbox"/> <i>Drawings</i> : Highlight the location of temperature and humidity monitoring systems on the Mechanical Plan or Air Distribution Plan. <input type="checkbox"/> <i>Design Analysis</i> : Provide a narrative from the mechanical engineer describing the location of, and monitoring instrumentation installed. Reference appropriate plan sheets where the equipment discussed is shown.		
Technologies /Strategies:	<p>Establish temperature and humidity comfort ranges and design the building envelope and HVAC system to maintain these comfort ranges. Install and maintain a temperature and humidity monitoring system in the building to automatically adjust building conditions as appropriate.</p> <p>Employ integrated envelope and HVAC system design strategies that achieve thermal comfort conditions based on mean radiant temperature, local air velocity, relative humidity, and air temperature. Consider integrating monitoring and controls with the building automation system. Specify in system operation manuals that all sensors require quarterly calibration. Include criteria verification and system operation in commissioning plan and report.</p>		

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5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C8 Daylight and Views ⁽²⁾

Intent: Provide for the building occupants a connection between indoor spaces and the outdoor environment through the introduction of daylight and views into the regularly occupied areas of the building.

Requirement: ☐ Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks. Spaces excluded from this requirement include copy rooms, storage areas, mechanical plant rooms, laundry, and other low occupancy support areas. Other exceptions for spaces where tasks would be hindered by the use of daylight will be considered on their merits. **1**

Suggested Documentation: ☐ *Design Analysis:* Provide calculations based on the Daylight Factor equation from the LEED2.0 Reference Guide showing that 75% of all spaces occupied for critical visual tasks have at least a 2% daylight factor.

Requirement: ☐ Achieve direct line of sight to vision glazing from 90% of all regularly occupied spaces. Examples of exceptions include copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Other exceptions will be considered on their merits. **1**

Suggested Documentation: ☐ *Design Analysis:* Provide calculations with supporting floor plan diagrams indicating the lines of sight and access to views for 90% of occupied spaces.

Technologies /Strategies: Design the building to maximize interior daylighting. Strategies to consider include building orientation, shallow floor plates, increased building perimeter, exterior and interior permanent shading devices, high performance glazing, and photo-integrated light sensors. Predict daylighting via calculations or model daylighting strategies with a physical or computer model to assess footcandle levels and daylight factors achieved. Design the building to maximize view opportunities.

5.C9 Acoustic Environment /Noise Control ⁽³⁾

Intent: Provide appropriate interior acoustic conditions that avoid deleterious noise effects and produce a basis for a positive soundscape acceptable to occupants and appropriate to their tasks.

Requirement: ☐ Meet the following criteria to minimize environmental noise through appropriate use of insulation, sound-absorbing materials and noise source isolation: **1**

- Recurrent background noise from external and internal sources shall not exceed 70db.
- All continuously occupied office space shall meet a NCC (Noise Criterion Curve) of no greater than NC-50.
- All classroom space shall meet an NCC of no greater than NC-45.
- Reverberation time for all continuously occupied space shall be no less than 0.4 seconds and no greater than 0.8 seconds.
- Speech Interference Level (SIL) for continuously occupied office spaces shall not be greater than 55db, OR Articulation Index shall not be < .55.

Suggested Documentation: ☐ *Specifications:* 13080 Sound, Vibration and Seismic Control.
☐ *Design Analysis:* Provide a narrative detailing the existing environmental noise issues and describe the measures employed to mitigate the environmental noise issues.

Technologies /Strategies: Evaluate each occupied environment and determine the appropriate layout, materials and furnishings design. Consult U. S. Army Corps of Engineers *Design Guide for Interiors* DG 1110-3-122.

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⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C10 Facility In-Use IAQ Management Plan⁽³⁾

Intent: Insure the effective management of facility air quality during its life.

Requirement: ☐ Perform all of the following: 1

- Develop an air quality action plan to include scheduled HVAC system cleaning.
- Develop an air quality action plan to include education of occupants and facility managers on indoor pollutants and their roles in preventing them.
- Develop an air quality action plan to include permanent monitoring of supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO₂), total volatile organic compounds (TVOCs), and particulates (including PM₁₀).

Suggested ☐ *Specifications:* 15900 HVAC Instrumentation and Controls.

Documentation: ☐ *Design Analysis:* Provide a draft version of the Air Quality Action Plan outlining occupant/manager training and also a systems maintenance schedule.

Technologies /Strategies: Provide action plan for periodic system maintenance, monitoring, occupant/manager training.

⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

6.0	Facility Delivery Process (FDP)	Score	7
6.C1	Holistic Delivery of Facility⁽³⁾		
Intent:	Encourage a facility delivery process that actively engages all stakeholders in the design process to deliver a facility that meets all functional requirements while effectively optimizing tradeoffs among sustainability, first costs, life cycle costs and mission requirements.		
Requirement:	<input type="checkbox"/> Choose team leaders that are experienced in holistic delivery of facilities.		1
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Provide a list of team leaders with a brief biographical synopsis stating qualifications and previous experience with projects where holistic delivery was a prime objective.		
Requirement:	<input type="checkbox"/> Train the entire team in the holistic delivery process. The team must include all stakeholders in the facility delivery, including the users, the contracting staff, the construction representatives, project manager, and design/engineering team members.		
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Provide a list of all stakeholders as well as training meeting dates and agendas for the meetings. Also submit a statement of qualifications for the person(s) performing the training. Training should include discussion of the SPiRiT or LEED Green Building Rating Systems, the importance of integrated design, and sample projects and methods used to meet the rating systems.		
Requirement:	<input type="checkbox"/> Identify project goals and metrics.		1
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Provide a list goals and objectives for the project. Discuss in a narrative how these goals will be measured.		
Requirement:	<input type="checkbox"/> Plan and execute a project planning charrette with team members.		1
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Include a section on the planning charrette, summarizing the results and indicating how it influenced the planning process.		
Requirement:	<input type="checkbox"/> Plan and execute an ecological design charrette with team members.		1
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Include a section on the ecological design charrette, summarizing the results and indicating how it influenced the design process. Also enclose the preliminary SPiRiT scoring sheet indicating the planned SPiRiT Certification Level and credits to be attained.		
Requirement:	<input type="checkbox"/> Identify and resolve tradeoffs among sustainability, first costs, life cycle costs, and mission requirements through charrettes and other collaborative processes.		
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Provide a list of the life-cycle cost critical facility elements determined during the charrette process. For each, show which tradeoffs were made and how the project benefited over the life-cycle from the decisions reached. Relate each to the mission.		
Requirement:	<input type="checkbox"/> Document required results for each phase of project deliverables that achieve the project goals and are measurable throughout the facility life span. Plan and execute SPiRiT Self-Assessment Scoring Charrettes with team members at final design and beneficial occupancy.		
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Provide a list of project benchmarks. Define what deliverables are necessary to document each of these benchmarks. Establish criteria to evaluate how well the project goals have been met at each of these benchmarks. Include a list of who should attend the Self-Assessment Scoring Charrettes at final design. Provide a copy of the self-assessment scoring sheets.		
Technologies /Strategies:	<p>Develop performance specifications or choose competitive range of products that meet environmental criteria. Follow the suggested design and project management guidelines provided in the SPiRiT Scoring Through Self-Assessment Charrettes Guide.</p> <p>Use automated modeling and analysis tools to assess site and facility design alternatives.</p> <p>Conduct life-cycle cost analysis (LCCA) in the design process according to the Federal Facilities Council Technical Report, Sustainable Federal Facilities: A Guide To Integrating Value Engineering, Life Cycle Costing, and Sustainable Development, FFC # 142, 2000.</p> <p>Conduct a full ecological assessment to include soil quality, water resources and flows, vegetation and trees, wildlife habitats and corridors, wetlands, and ecologically sensitive areas to identify the least sensitive site areas for development. Evaluate space utilization/functions to reduce overall space requirements, considering networking, flextime, flexi-place, dual-use, and other strategies to reduce space requirements/optimize facility size.</p>		

⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

7.0	Current Mission (CM)	Score	6
7.C1	Operation and Maintenance⁽³⁾		
Intent:	Encourage the development of a facility delivery process that enhances effective operation and maintenance of the facility contributing to the productivity and well-being of the building occupants.		
Requirement:	<input type="checkbox"/> Develop a facility operations and maintenance program to include comprehensive facility operations and maintenance instructions for system operation, performance verification procedures and results, an equipment inventory, warrantee information, and recommended maintenance schedule. The instructions should include a comprehensive, preventive maintenance program to keep all facility systems functioning as designed and ensure effective indoor air quality.	1	
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Submit a copy of the facility operations and maintenance manual that includes, at a minimum, a section on each in the areas listed in the requirement portion of this credit.		
Requirement:	<input type="checkbox"/> Develop a periodic training program for occupants, facilities managers, and maintenance staff in all facility operations and maintenance activities including: <ul style="list-style-type: none"> Instructions on sustainable cleaning and integrated pest management practices. A comprehensive site/facility recycling/waste management plan. An air quality action plan to include scheduled HVAC system cleaning. 	1	
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Submit a copy of the training program with a schedule of when trainings should be held. Training topics should, at a minimum, include the areas listed in the requirement portion of this credit.		
Requirement:	<input type="checkbox"/> Provide surfaces, furnishings, and equipment that are appropriately durable and cost effective, according to life cycle cost analysis. Surfaces to be considered, at a minimum, are flooring, counter tops, wall coverings, modular furniture included in the construction contract, cabinetry, and bathroom fixtures and enclosures.	1	
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Submit a narrative describing the criteria used in the selection of surfaces, furnishings, and equipment for the facility and showing their life-cycle cost effectiveness. Provide cut sheets showing the durability of the selected items.		
Technologies /Strategies:	Plan for facility elements, systems, and subsystems to be maintained on a routine maintenance schedule to ensure integrity and longevity. Develop a plan for scheduled cleaning and maintenance activities to be accomplished with nontoxic environmentally preferable cleaning products and procedures. The plan should also include keeping air ducts clean and free of microorganisms through a structured program of preventive maintenance and cleaning of lighting systems following a regular maintenance schedule to ensure optimum light output and energy efficiency. Set up and integrated pest management plan that uses pesticides and herbicides sparingly and only when necessary with preference to natural methods and materials over poisons and toxic agents.		

⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

7.0 Current Mission (CM) (continued)

7.C2 Soldier and Workforce Productivity and Retention⁽³⁾

Intent:	Provide high-quality, functional, and safe work and living environments to promote the well-being of building occupants and promote soldier and workforce retention.		
Requirement:	<input type="checkbox"/> Provide a high quality indoor environment by obtaining at least 11 IEQ credits and following the design methods defined in the Engineer Interior Design Guide 1110-3-122, especially Appendix B.		1
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Prepare a narrative of design considerations and steps taken in the design process to enhance the quality of the indoor environment, and contribute to the well-being and safety of the building occupants. Specifically address each of the credits obtained.		
Requirement:	<input type="checkbox"/> Provide a high quality indoor environment by obtaining an additional 3 IEQ credits (for a total of 14 IEQ credits) and following the design methods defined in the Engineer Interior Design Guide 1110-3-122, especially Appendix B.		1
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Prepare a narrative of design considerations and steps taken in the design process to enhance the quality of the indoor environment, and contribute to the well-being and safety of the building occupants. Specifically address each of the credits obtained.		
Requirement:	<input type="checkbox"/> Provide a high quality indoor environment by obtaining all 17 IEQ credits and following the design methods defined in the Engineer Interior Design Guide 1110-3-122, especially Appendix B.		1
Suggested Documentation:	<input type="checkbox"/> <i>Design Analysis:</i> Prepare a narrative of design considerations and steps taken in the design process to enhance the quality of the indoor environment, and contribute to the well-being and safety of the building occupants. Specifically address each of the credits obtained.		
Technologies /Strategies:	<p>Use a registered/certified interior designer to provide stimulating interior environments with pleasant colors, surface treatments, room proportions and ceiling heights, external views, natural lighting, and quality detailing for interior furnishings, equipment, materials, and finishes. Use IES standards to provide light to occupied space with variations in level, comfortable contrasts, natural color rendition, natural/man-made, and adequate controls to optimize light aesthetic qualities. Provide occupant control of individual work areas configuration, and lighting, thermal and ventilation systems.</p> <p>Collaborate with end users to identify functional and technical requirements and to perform adjacency studies. Configure occupied space to address the specific workers/occupants functions and activities that will be carried out there. Meet TI 800-01 Design Guide requirements. Design and configure occupied space, and select furniture and equipment using human ergonomics. Identify existing user amenities, such as dining, recreation, socialization, shopping, and child care facilities. Identify what amenities should be incorporated into the project or provided in the future, nearby facility. Provide ventilation air in sufficient volume free from natural and man made contaminants.</p>		

⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

8.0	Future Missions (FM)	Score	4
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8.C1 Functional Life of Facility and Supporting Systems⁽³⁾

Intent: Assess the functional life of a facility and its supporting systems to optimize the infrastructure investment.

Requirement: ☐ Identify how long the designed function is likely to occupy the current facility. **1**

Suggested Documentation: ☐ *Design Analysis:* Provide a narrative discussing the typical or likely lifespan of the function(s) to be accommodated in the facility. Forecast eventual adaptation to a different use(s). Assess the life spans of the various building systems/components to forecast their revision/replacement during the facility lifespan.

Requirement: ☐ Identify how long the envelope, structure, HVAC, plumbing, communications, electrical, and other systems are likely to last before requiring replacement or upgrade. Consider economic, functional, and physical obsolescence. **1**

Suggested Documentation: ☐ *Design Analysis:* Provide a narrative discussing the typical or likely lifespan of the function(s) to be accommodated in the facility. Forecast eventual adaptation to a different use(s). Assess the life spans of the various building systems/components to forecast their revision/replacement during the facility lifespan.

Technologies /Strategies: Assess the typical or likely lifespan of the function(s) to be accommodated to forecast eventual adaptation to a different use(s). Assess the life spans of the various building systems/components to forecast their revision/replacement during the facility lifespan and design in a manner that facilitates revision/replacement.

Consider the life span of the weapon systems, doctrines, or other programs supported by the facility.

Use life cycle data and other sources to identify the life span of the embodied systems.

8.C2 Adaptation, Renewal and Future Uses

Intent: Encourage facility design that is responsive to change over time to maximize accommodation of future uses without creating waste and insuring maximum useful life of products.

Requirement: ☐ Identify possible future uses for the facility; consider alternatives that expand the list of possible future uses. AND Design the building to accommodate as wide a range of future uses, as practical. AND Design the installation of building systems to accommodate foreseeable change with a minimum amount of disruption, cost, and additional materials. **1**

Suggested Documentation: ☐ *Design Analysis:* Discuss in a narrative possible future uses of the facility. Describe the design features that have been implemented to accommodate possible future uses. Also discuss measures taken to reduce the disruption and cost of adapting the building or building systems for a future use.

Requirement: ☐ Build the smallest facility necessary to meet current mission functional requirements, using the most efficient shape and form, while taking into consideration expansion capabilities and potential future mission requirements. AND Design the facility for recycling of materials and systems. **1**

Suggested Documentation: ☐ *Design Analysis:* Discuss in a narrative how the design optimizes the use of the available space. Discuss features that make the building more space efficient. Also discuss which building materials and systems can be recycled and measures taken to insure that these will be recycled rather than discarded at the end of their useful life.

Technologies /Strategies: Create durable, long-lasting, and adaptable facility shell and structural system. Create an adaptable, flexible facility design using open planning, service corridors, interstitial space, access floors, demountable walls/partitions, modular furniture, and other adaptable space configuration/utilization strategies.

Select materials that are recyclable, avoiding composite materials, such as reinforced plastics and carpet fibers and backing. Consider selecting materials and labeling construction materials with identification information to facilitate recycling. Use pre-cut/pre-fabricated materials and use standard lengths and sizes (dimensional modularity) in design. Design facility systems and subsystems for reconfiguration and/or disassembly/recycling using reversible/reusable connectors.

⁽³⁾ Added material not reviewed or endorsed by U. S. Green Building Council.

Facility Points Summary

1.0 Sustainable Sites (SS)		Score	Max 20
1.R1	<input type="checkbox"/> Erosion, Sedimentation and Water Quality Control		[Required]
1.C1	<input type="checkbox"/> Site Selection		2
1.C2	<input type="checkbox"/> Installation/Base Redevelopment		2
1.C3	<input type="checkbox"/> Contaminated Site Redevelopment		1
1.C4	<input type="checkbox"/> Alternative Transportation		4
1.C5	<input type="checkbox"/> Reduced Site Disturbance		2
1.C6	<input type="checkbox"/> Stormwater Management		2
1.C7	<input type="checkbox"/> Landscape and Exterior Design to Reduce Heat Islands		2
1.C8	<input type="checkbox"/> Light Pollution Reduction		1
1.C9	<input type="checkbox"/> Optimize Site Features		1
1.C10	<input type="checkbox"/> Facility Impact		2
1.C11	<input type="checkbox"/> Site Ecology		1
2.0 Water Efficiency (WE)		Score	Max 5
2.C1	<input type="checkbox"/> Water Efficient Landscaping		2
2.C2	<input type="checkbox"/> Innovative Wastewater Technologies		1
2.C3	<input type="checkbox"/> Water Use Reduction		2
3.0 Energy and Atmosphere (EA)		Score	Max 28
3.R1	<input type="checkbox"/> Fundamental Building Systems Commissioning		[Required]
3.R2	<input type="checkbox"/> Minimum Energy Performance		[Required]
3.R3	<input type="checkbox"/> CFC Reduction in HVAC&R Equipment		[Required]
3.C1	<input type="checkbox"/> Optimize Energy Performance		20
3.C2	<input type="checkbox"/> Renewable Energy		4
3.C3	<input type="checkbox"/> Additional Commissioning		1
3.C4	<input type="checkbox"/> <<Deleted>>		-
3.C5	<input type="checkbox"/> Measurement and Verification		1
3.C6	<input type="checkbox"/> Green Power		1
3.C7	<input type="checkbox"/> Distributed Generation		1
4.0 Materials and Resources (MR)		Score	Max 13
4.R1	<input type="checkbox"/> Storage & Collection of Recyclables		[Required]
4.C1	<input type="checkbox"/> Building Reuse		3
4.C2	<input type="checkbox"/> Construction Waste Management		2
4.C3	<input type="checkbox"/> Resource Reuse		2
4.C4	<input type="checkbox"/> Recycled Content		2
4.C5	<input type="checkbox"/> Local/Regional Materials		2
4.C6	<input type="checkbox"/> Rapidly Renewable Materials		1
4.C7	<input type="checkbox"/> Certified Wood		1
5.0 Indoor Environmental Quality (IEQ) [Q]		Score	Max 17
5.R1	<input type="checkbox"/> Minimum IAQ Performance		[Required]
5.R2	<input type="checkbox"/> Environmental Tobacco Smoke (ETS) Control		[Required]
5.C1	<input type="checkbox"/> IAQ Monitoring		1
5.C2	<input type="checkbox"/> Increase Ventilation Effectiveness		1
5.C3	<input type="checkbox"/> Construction IAQ Management Plan		2
5.C4	<input type="checkbox"/> Low-Emitting Materials		4
5.C5	<input type="checkbox"/> Indoor Chemical and Pollutant Source Control		1
5.C6	<input type="checkbox"/> Controllability of Systems		2
5.C7	<input type="checkbox"/> Thermal Comfort		2
5.C8	<input type="checkbox"/> Daylight and Views		2
5.C9	<input type="checkbox"/> Acoustic Environment /Noise Control		1

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Facility Points Summary (Continued)

Maximum
Points

6.0	Facility Delivery Process (FDP)	Score		Max 7
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6.C1	<input type="checkbox"/> Holistic Delivery of Facility		7
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7.0	Current Mission (CM)	Score		Max 6
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7.C1	<input type="checkbox"/> Operation and Maintenance		3
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7.C2	<input type="checkbox"/> Soldier and Workforce Productivity and Retention		3
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8.0	Future Missions (FM)	Score		Max 4
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8.C1	<input type="checkbox"/> Functional Life of Facility and Supporting Systems		2
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8.C2	<input type="checkbox"/> Adaptation, Renewal and Future Uses		2
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Total Score Max 100

SPiRiT Sustainable Project Certification Levels

SPiRiT Bronze			25 to 34 Points
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SPiRiT Silver			35 to 49 Points
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SPiRiT Gold				50 to 74 Points
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SPiRiT Platinum				75 to 100 Points
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Project Points of Contact

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